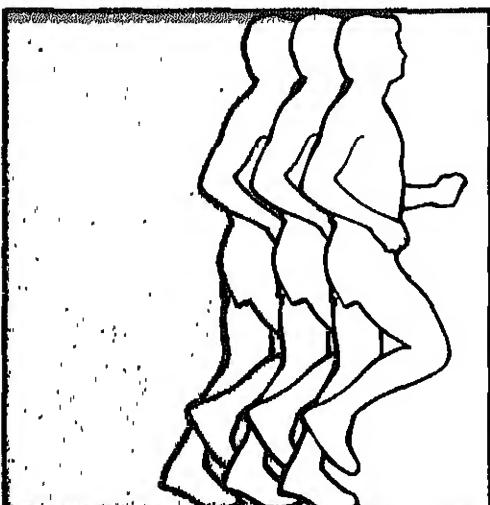
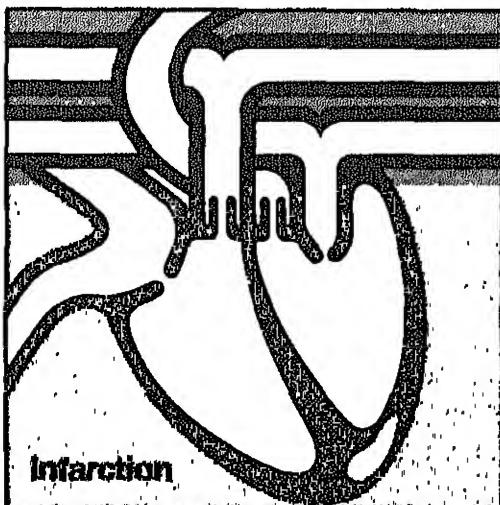
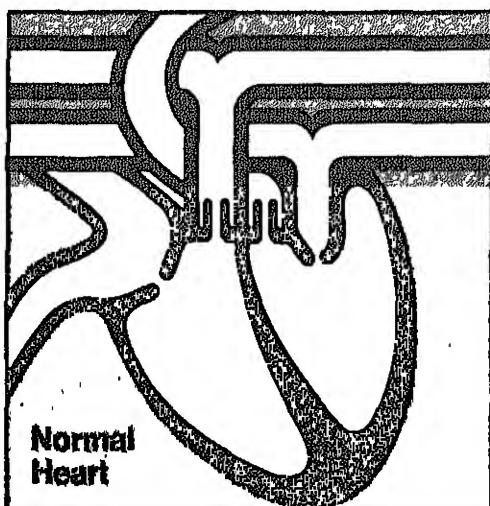
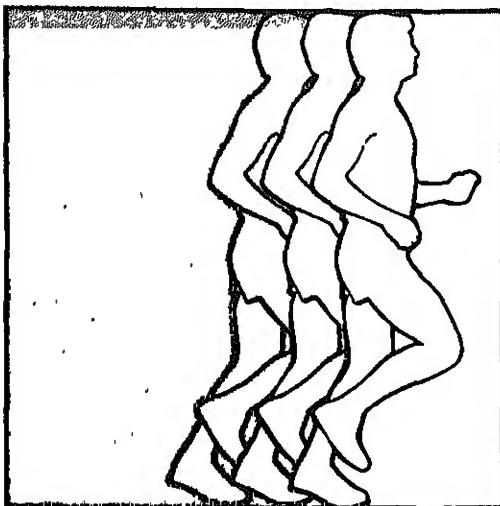


# Conference Proceedings

## **Alternatives in Cardiac Care:**

**Prevention . . .**



***and Rehabilitation***

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American Heart Association  
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Rehabilitation Services Administration

**ALTERNATIVES IN CARDIAC CARE:  
PREVENTION AND REHABILITATION  
CONFERENCE**

**October 9-10, 1979**

**American Heart Association  
National Center  
7320 Greenville Avenue  
Dallas, Texas**

**EDITED BY:**

**Robert M. Levenson, M.D.  
Matthew Maxon  
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CONFERENCE ON ALTERNATIVES IN CARDIAC CARE:  
PREVENTION AND REHABILITATION

**PURPOSE**

The purpose of this conference is to provide a forum for exchange of views, goals, needs, techniques, staffing patterns, program structure, delivery mechanisms, and future directions for the use of exercise as a diagnostic and therapeutic tool in medicine and cardiology.

The common basis for these programs will be presented, followed by roundtable, developmental discussions. The final session will be designed to provide insight into future directions of prevention and rehabilitation of patients with cardiovascular disease, while clarifying standards.

## TABLE OF CONTENTS

	<u>Page Number</u>
<b>KEYNOTE SPEECH</b>	
Issues in Exercise Testing Programs . . . . .	Samuel M. Fox, III, M.D.      2
 <b>EXERCISE PROFESSIONALS IN EXERCISE TESTING AND TRAINING</b>	
Physicians . . . . .	Blair D. Erb, M.D.      12
Physiologists . . . . .	Neil B. Oldridge, Ph.D.      23
Other Professionals . . . . .	Kathy Berra, B.S.N.      28
 <b>EXERCISE TESTING AND TRAINING SETTINGS</b>	
In-Hospital Program . . . . .	Gerald F. Fletcher, M.D.      36
Free Standing Centers . . . . .	L. Loring Brock, M.D.      57
Community Facility . . . . .	Donald G. Pansegrouw, M.D.      60
 <b>PATIENTS IN EXERCISE TESTING AND TRAINING</b>	
Post MI Patients . . . . .	Richard A. Carleton, M.D.      65
Post Coronary Bypass Graft Surgery . . . . .	Henry S. Miller, Jr., M.D.      70
Patient Psychology . . . . .	Thomas P. Hackett, M.D.      75
 <b>THIRD PARTY PAYMENT FOR EXERCISE TESTING AND PROGRAMS</b>	
Services, What Patients, How Long, Requirements . . . . .	Robert W. Hoffman, M.D.      80
 <b>INDUSTRIAL PROGRAMS</b>	
Eligibility Program, Company, Free Time, Results . . . . .	Richard Keelor, Ph.D.      83
 <b>GUEST SPEAKER</b>	
Cardiac Rehabilitation Unit Survey Results . . . . .	Henry P. Keynes      90
 <b>RECOMMENDATIONS</b>	
 <b>PARTICIPANT ROSTER</b>	
	106

WELCOME

ROBERT M. LEVISON, M.D.:

By the time we finish this conference, I hope we will have some notion of the appropriate activities of the groups involved in this kind of exercise effort. There are a couple of results of this conference that I can foresee and others will probably occur. First, the proceedings of this meeting should be presented to the groups you represent for their reaction; secondly, I hope there will be continued meetings between the groups represented here. We need to resolve some of the problems that arise from time to time.

Designated Representatives:

AMERICAN HEART ASSOCIATION . . . . .	Robert M. Levenson, M.D. Richard A. Carleton, M.D. Gerald F. Fletcher, M.D. Patrick A. Gorman, M.D. Thomas P. Hackett, M.D.
AMERICAN COLLEGE OF CARDIOLOGY . . . . .	Samuel M. Fox, III, M.D.
AMERICAN COLLEGE OF SPORTS MEDICINE . . . . .	James S. Skinner, Ph.D.
AMERICAN COLLEGE OF CHEST PHYSICIANS . . . . .	Eugene J. Spiotta, M.D.
AMERICAN COLLEGE OF PHYSICIANS . . . . .	Blair D. Erb, M.D.
AMERICAN MEDICAL ASSOCIATION . . . . .	Richard J. Jones, M.D.
REHABILITATION SERVICES ADMINISTRATION . . . . .	Sterling B. Brinkley, M.D.
PRESIDENT'S COMMITTEE ON EMPLOYMENT OF THE HANDICAPPED. . . . .	Paul S. Entrmacher, M.D.

DR. LEVENSON:

For as long as I can remember Dr. Sam Fox has been active in the American Heart Association, the College of Cardiology, and with national exercise activities. We are very fortunate to have Dr. Fox to set the tone for this meeting. He will provide a perspective on the issues that this meeting will be discussing.

KEYNOTE SPEECH

Samuel M. Fox, III, M.D.

It is indeed an honor and privilege to meet with you. I hope to touch on areas which draw us together, rather than to highlight any difference in the approach of the many agencies and interests we represent. Many of us have multiple interests and affiliations. I think Pogo was right in his comments that "we have met the enemy and they are us." In some respects we get in our own way at times. On this occasion we have the opportunity to pull different ideas, different concepts of how service can best be provided to the consumer, be he a potential patient or someone seeking to maintain or restore good health. The magnitude of the responsibilities that we face is awe inspiring. In the United States (population 215 million) there are 2.5 million individuals under age 65 with clinical manifestations of coronary heart disease, the major organic disease plague of the modern era. Some estimates are much larger than this.

That might not be so burdensome were it not for the figures of Dr. Doyle's Albany civil servant study and the Framingham data indicating that in 20% of patients the first manifestation of coronary heart disease is sudden death. Thus we need to identify the population at risk and to determine what can be done to reverse the circumstances which lead to obstructive coronary disease and such other features as spasm, platelet aggregation, etc. We cannot satisfy our obligation by expecting these people to come to our attention through normal channels. It is important to develop improved screening techniques, which are not presently available. Drs. Weiner and Ryan's recent report is a forceful remainder of the limitations of the exercise test in developing the information at a sensitive enough level to detect all those people at risk and not excite others by generation of the so-called "False Positive" response.

For every hundred thousand citizens in an average community there are likely to be eleven hundred under age 65 with angina, post myocardial infarction or coronary insufficiency due to coronary disease. Many over this arbitrary age limit are also impaired. We do not have a national program defining how to manage these patients appropriately. In the same hundred thousand population there would be over 300 survivors of acute myocardial infarction who are in need of support both psychological and physical. They need retraining, education, and comprehensive risk factor reduction to return to an active and self-sufficient role. That's 660,000 individuals in the United States.

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Acknowledgements These remarks were developed with support in part from Preventive Cardiology Academic Award HL 00660 of the National Heart, Lung and Blood Institute, NIH.

About two million individuals or over one thousand of all ages in the same size community have significantly limiting angina pectoris. With the obvious success of bypass surgery there is a large pool of individuals needing evaluation for possible surgery and support services to come back from coronary bypass surgery and realize their new capabilities.

I am sure that Dr. Sterling Brinkley is better informed on the figures but my understanding is that one-third of all individuals placed on the disability roles of the Social Security Administration are there because of cardiovascular diseases.

Recently, the firm of Yankelovich, Skelly and White published a survey indicating that there were forty million Americans who "jog" or "run". That is considered by most to be high. More conservative figures would suggest ten million. Within the last ten years the figure has increased from one million. Among these are many individuals who have been advised, and with some justification, that they get an exercise tolerance test before engaging in vigorous physical effort. Yet we know from the existing data that evaluating those people without symptoms and at low risk is financially and emotionally fraught with hazards and often inadequate justification. Do they need exercise tests? If so, how to go about it?

I am impressed with Dr. Hartley's report of the New England Cardiovascular Institute on how screening can be performed with appropriate physicians' review and how the supervision of a large number of individuals can be conducted well. There is also the question of appropriate testing without physicians, i.e. under what circumstances; how should screening be done; what risk level should be acceptable both as to age and risk factor status such that there is an acceptably low hazard for individuals to be tested without the presence of physicians. This brings to mind a recent event. I was walking in New York when a street vendor handed me a card imprinted with: "If you are not in the condition you should be, you will be in twelve weeks." This was from a private enterprise gym. It appears to represent a legitimate opportunity, whether with weight training apparatus or other things which may not be what aerobic training enthusiasts might prefer, to serve as a fitness and testing center. Now "Fitness" is on the streets, so to speak, and we may have to provide quality control standards for such facilities.

In any case, exercise testing is in need of refinements in Sensitivity, Specificity and Predictive value and also in that fascinating new approach (that I have difficulty in explaining to our students), the posterior probabilities or probability of having significant disease after a number of tests. There are a number of approaches to increase the Sensitivity and reduce both the False Positives and False Negatives. This must be done in a cost effective manner, for today we have more intriguing techniques that may shed useful light on a question than we or the system can afford to use without discrimination.

We have to recognize that testing is still being performed only to arbitrary heart rate levels. Dr. Robert Bruce, whose pioneering work we all applaud, has long been encouraging us to use symptom-limited testing. Dr. Bruce and his group have demonstrated that under appropriate circumstances maximal testing is a safe procedure and offers much useful information.

There is also reason to believe that we can increase the accuracy and usefulness of testing by looking at the total response, not just the ST segment. As clinicians we know this but perhaps have not paid enough attention to it. The changes of the blood pressure, the change in the Korotkoff tones, the facial pallor and other obvious means of appraisal tell

us more than that which was always revealed by the electrocardiographic responses alone. However, the electrocardiographic response can be increased in its sensitivity as demonstrated by Drs. Kim Fox, Schillingford, and others from Hammersmith, England in their intriguing work with a 16-lead grid applied after exercise and apparently very helpful in increasing sensitivity. The question is before us whether we all have to go in this direction requiring more electrodes and recorder capabilities. Clearly we are limited with the antiquated sigmoid curve of precordial leads and it is about time somebody shook us up a bit and encouraged further lead system development.

Other approaches have been tried. Dr. Ellestad has emphasized the significance of changes in R-wave amplitudes. Many are less convinced of its value but it has served as a valuable observation. The initial QRS vector changes have been studied by Kilpatrick again at Hammersmith. Such changes as a unique indication of coronary obstruction have been infrequent in my experience but we should look to such helpful responses as well as the classical ST segment changes. And, as I mentioned, a good physical examination and symptom evaluation should increase our sensitivity. A louder  $S_3$  or  $S_4$  gallop sound appears to provide useful correlations and precordial motion, as presented by the cardiosphygmographic approach, looks informative.

Another important use for exercise testing is in providing motivation to patients to really get their change in life style off to a good start and to keep it up. To me the actual "road test" is a much more convincing means of persuasion of either the need for, or the benefits of, a continued activity program, weight reduction and good nutrition than all the necessary and highly justified risk factor measurements that also should be periodically repeated. Our question must be how to make a cost effective use of exercise testing for motivation - along with its other more accepted applications.

In many patients with hypertension we know little of their blood pressure responses as they actually live, work and love. Thus we need to develop better techniques for assessment of operational blood pressures.

Until they are widely available, an exercise tolerance test, perhaps better performed on a treadmill than a bicycle ergometer, can give information that helps greatly in adjusting the dosage of medications and tolerance for vasodilators as contrasted to diuretic, Beta-blockers and other agents. Again we need to learn how to do this in a cost effective manner.

Another new and exciting area is the use of radionuclides and exercise. How do we combine these and at what stage? We have exciting reports of the usefulness of both the Thallium "perfusion" scan and more recently the "multigated, equilibrium blood pool" or first pass radionuclide ventriculograms. Both of these are somewhat expensive techniques and require some slight radiation exposure. After Three Mile Island we had numerous questions, some of which were very hard to answer, as to the long-term radiation effects of low-level and presently quite acceptable levels of isotope exposure. We have a great deal to undertake in research, some of which is well started.

Those who have had a chance to look at this month's Circulation have seen the Japanese report on exercise echocardiography, a difficult technique even in the hands of these careful investigators but another area in which exercise testing and its appreciation may prove important.

Ballistocardiography is something which is still being looked at and probably deserves further attention. Over ten years ago Dr. Skinner did a fascinating study on individuals undertaking an exercise program to evaluate the immediate post exercise and post training ballistic waves. The question is whether the data is competitive with information otherwise available, and at what cost?

Another recent development is the predischarge exercise test. This is performed at a low level but one which permits the clinician to advise exercise restrictions or recognition of the inappropriateness of early discharge from the hospital of certain individuals. This appears to have great clinical usefulness. If predischarge exercise and a nuclide procedure are used together we can see a significant escalation in cost. Guidelines are needed to assist the third party carriers in supporting studies which demonstrate what techniques are truly cost-effective. Several of you have been involved in looking at what procedures should have more careful evaluation and justification before they are approved for "routine" use.

Now, I must shift to rehabilitation, our second major area of interest here. Again we need to refine the equations expressing cost/benefit relationships and then operate therein. There is a sigmoidal curve often defined in which much effort must be expended before there is much yield; then there is an area of relatively steep rise in yield for further investment, but finally to achieve much higher levels of benefit there is a flattening off to an asymptote. To achieve really superior results, huge investments are required. We must evaluate our operations in regard to these circumstances such that the increment of added investment for rehabilitation is returned to individuals and society in a meaningful increment of improved function. We are looking for the optimal; not the maximal.

What are the stages of rehabilitation? There are many definitions and some of our present problems relate to this.

In-hospital rehabilitation services including education are recognized as being of value. Early activity offers both physiologic support and reassurance. It also prevents the loss of bone strength, muscle mass, muscle tone and muscle competence and starts the change toward the positive. However, during the acute episode activities must be reduced to avoid overloading the still healing heart and to diminish the possibility of ventricular rupture or dysrhythmia.

A significant problem area has been our inability to convince third party carriers, our health insurance colleagues, that a healing heart needs as much or more rehabilitation as the healing fracture or lymphatic system after surgical procedures such as mastectomy. Increasingly we have evidence that they believe that hospital rehabilitation activities should be included in standard nursing services and yet it is not easily managed within the staffing patterns of most coronary care units. Having nurses (of which there is a growing shortage) work with the patient in the educational area, in physical activity, nutritional counseling and support of their abstinence from the use of tobacco may prove very difficult and may be better managed by a team approach. These added services, which often require special talent and time, are not yet widely accepted by the third party carriers. With the legitimate pressures for cost restraints it is understandable why we must exercise frugality in requesting added support. It is also very important to provide these services. Emergency and immediate care is not adequate as an introduction to the change of lifestyle which will be necessary to these individuals when they leave the hospital. They need health education, particularly when short hospital stays are routine.

Early low level exercise evaluation of the post myocardial infarction patient, within the first ten to twenty-one days, can lead to early discharge of many with assurance that they will do well. Such testing can be cost effective by reducing some hospital stays. But it imposes on us all the added responsibility of being sure the lifestyle changes have been convincingly absorbed by the patient.

The Continued Healing Phase, the period from discharge to the time at which a more vigorous training program may be started, is the period for gradual return to more normal living habits and responsibilities and restoration of self-image at a more rapid rate than in the past. Robert DeBusk, M.D., William Haskell, Ph.D., and Kathy Berra, R.N. from Palo Alto and others have shown that those at low risk may be identified and encouraged to increase their activities. Nanette Wenger, M.D. is probably right in stating that this period may be less than the three months defined by Drs. Kenneth Mallory and P.D. White but it must be a time of gradual increase. The main objective is psychological recovery while the heart heals, but we should not hazard the heart to reassure the mind. At the present the greatest national lack of adequate rehabilitation services is in this "Continued Healing Phase". Much can be accomplished by getting patients out of an overprotected home environment.

A question before us is to consider the length of the Retraining Phase. Dr. Leonard Dreifus, Past President of the American College of Cardiology, attempted to define a reasonable "third stage" outpatient program. The Social Security Administration felt that twelve weeks was sufficient while the majority of involved practitioners felt that a longer program would be of great value for most individuals. A program consisting of the following was proposed:

Three sessions a week for 12 weeks	=	36 sessions
Two sessions a week for 12 weeks	=	24 sessions
One session a week for 12 weeks	=	12 sessions
One session every other week for 12 weeks	=	6 sessions
<hr/>		78 sessions

Third party carriers were difficult to understand until I learned the manner in which they operated. Some of them in our area did not feel they could support free standing cardiac rehabilitation programs not affiliated with hospitals. Their accounting is based on an understanding, both written and implied, with hospital administrators. They are familiar with this approach and feel sure that the charges against their plan are appropriate. They are concerned about only providing services that are necessary without over-utilization. So, it is important that we work with the third party carriers in a manner which permits them to take logical steps. The freestanding agencies such as the YMCA's Jewish Community Centers and others, represent some major opportunities for providing useful services but we must help devise programs which give appropriate reassurances to the third party carriers so they can participate in the care of all the patient populations needing support.

Another problem to be considered is electrocardiographic monitoring during this "Retraining Phase". Most clinicians seem willing to move to periodic checking and not continuous assessments, but some patients have enough ectopy to justify continuous monitoring on an almost regular basis. Thus, we have to develop the criteria to get our patients off such expensive monitoring when appropriate, as well as moving them through the stages of our programs.

Finally, we need to consider the Maintenance Phase to last the rest of the patient's life. This is usually unsupervised - to home or other facility-type program. We should develop criteria to move people as rapidly as possible, but at acceptably low hazard, so that we can increase their total life function, decrease their disability, decrease the risk factors, and hopefully prevent progression of their disease.

Having completed the formal schedules, the patient moves to a maintenance type program. I believe that we should encourage people to engage in activity programs for the rest of their lives and perhaps, they can be rewarded with incentives by their employers or insurance companies, but this has yet to be accepted as a part of third party responsibility.

Utilization review has been mandated by the "Blues" in our area as they provide coverage for the third phase, that is the outpatient hospital-affiliated programs of the Retraining Phase. This is the first time in our area that utilization review has been applied to outpatient services. Initially the "Blues" considered requiring two physicians, not related to the institution, to conduct a monthly review. Now they will accept a review by the program staff and others such as a hospital record librarian with an insurance company representative able to sit in at any time. The utilization review requested by third party must cover one-tenth of all patients per month and at least three records, a reasonable request, I believe.

They have also requested an internal audit to be sure that criteria for adequate record keeping and evaluation of patients are made and adhered to. This brings me to the last item that time permits - an attempt to develop "Exit Criteria" which would serve as a means to insure that we do not invest excessive resources disproportionately in cardiac rehabilitation.

If, and only if, a patient is psychologically rehabilitated to use his physical capabilities effectively would these be applied as a means to move patients from an insurance supported "Retraining Phase" to the "Maintenance Phase". Only if he or she could achieve these levels without significant (0.10 mV flat or divergent) ST segment displacement during exercise and only if free of complex and presumably hazardous dysrhythmia would these Exit Criteria apply:

Supervised Cardiac Rehabilitation Program Exit Criteria  
Based on Physical Working Capacity in METs\*

Age	MALES		FEMALES	
	METs	Oxygen Consumption	METs	Oxygen Consumption
49 or less	10	35 ml/min./Kg.	8	28 ml/min./Kg.
50-59	9	31½ ml/min./Kg.	7	24½ ml/min./Kg.
60-69	8	28 ml/min./Kg.	6½	23 ml/min./Kg.
70 and over	7	24½ ml/min./Kg.	6	21 ml/min./Kg.

\*METs refers to multiples of "resting" oxygen consumption, which is defined as 3.5 milliliters of oxygen per minute per kilogram of body weight

In the workplace it has been customary for work physiologists to expect men to manage on 40% or at most 50% of their aerobic capacity for an 8-hour day. Forty percent of 10 METs is only 4 METs for men up to age 50, which will include vigorous walking but only a slow pace in climbing stairs or carrying a machine part to and from a machine tool. These criteria are suggested to stimulate comment and more research rather than to establish limits at the present time.

This meeting should help us all understand better our respective roles in providing services to our patients. Perhaps even more importantly, it will help establish areas where more research and/or development is needed to live up to our full capabilities in the prevention, clinical care and rehabilitation of cardiovascular and related diseases so that more people can enjoy a higher quality of life for longer at less expense.

May I close by thanking the officers and staff of the American Heart Association for their foresight and generosity in being our hosts. We have a great opportunity in most appropriate and stimulating surroundings to define how to implement more effective systems of health preservation and enhancement.

POST CORONARY REHABILITATION -  
IS IT WORTH THE EFFORT AND COST?

Samuel M. Fox, III, M.D.  
Professor of Medicine  
Director, Cardiology Exercise Program  
Georgetown University Medical Center

There are at least five areas of potential benefit from such rehabilitation efforts:

- I. Increased Physiologic Capacity:
  - More rapid return to higher physical work capacity
  - Lower heart rate at a specific work load
  - Lower blood pressure at a specific work load
    - (Thus lower "Double Product" as an index of Myocardial Power Requirement for a given task)
  - Less hypovolemia-postural hypotension, hemoconcentration
  - More appropriate peripheral blood distribution and return
  - Less thrombophlebitis - better heat and cold tolerance
  - Stimulus for collateral vascularization
  - Stimulus for increased arterial size
    - Not yet demonstrated in CHD
  - Reduced muscle wasting and bone demineralization
  - Less pulmonary atelectasis, thromboembolism
- II. More Favorable Biochemical Status:
  - Reduced triglyceride levels - brief (24-48 hours)
  - Increased High Density Lipoprotein Cholesterol Levels
  - Reduced Low Density Lipoprotein and Total Cholesterol
  - Reduced need for insulin in diabetics - enhanced utilization of available insulin
  - More advantageous caloric balance and nutrition
  - Enhanced fibrinolytic activity - brief
  - Increased red blood cell mass and blood volume
  - Decreased platelet stickiness - debated
    - Less thrombophlebitis
  - Less neurohormonal over-reaction
  - Less vulnerability to dysrhythmias
- III. Psychological Support:
  - "Positive action engenders positive thinking"
  - Less anxiety/depression - less dependency
  - Better sleep quality
  - Better muscular relaxation
  - Less subjective fatigue
  - Increased tolerance to stress
    - Less "strain resulting from psychic "stress"
  - Encouragement to prudent living habits
  - More satisfactory sexual responses
- IV. Socio-Economic Benefits:
  - Less long hospitalization - better bed utilization
  - Less need for personnel services to patients during and after hospitalization
  - Less incapacity/dependency at home
  - More prompt return to work
  - More physical and mental stamina at work

More enthusiasm and creativity  
Fewer earlier retirements - lower pension costs  
Less subsequent lost time from work, community, family

V. Reduced Morbidity/Mortality:

(Better Epidemiologic status)

Fewer complications

Fewer recurrences                  Debated

Lesser mortality

No increased coronary complications or other significant morbidity has been reported with rehabilitation programs

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Phases of Post-Infarct and Post-Surgical Cardiac Rehabilitation

- I. In-Patient starting with passive motion as soon as the patient "stabilized"  
Progression to slow walking, showering, possibly stair climbing under instruction  
A pre-discharge, low level exercise tolerance evaluation has proven valuable for guidance
- II. Continued Healing Phase - to avoid deterioration and permit slow expansion of activities as healing becomes more secure.
- III. Training, Restoration Phase -  
After healing is essentially complete
  - a. closely monitored (Hardwire or Radiotelemetry)
  - b. supervised (but without continuous ECG) phase
  - c. unsupervised phase
- IV. Maintenance Phase -  
To set pattern for life-long activities  
Activities must be "rewarding - preferably fun."

Education, understanding, conviction and commitment to a program are essential.

Physical activities, as with surgery, must be accompanied by necessary modifications in total calories consumed and particularly animal fats, cessation of tobacco use, blood pressure control, stress reduction and good management of glucose intolerance.

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Magnitude of the Coronary Disease Problem

For every 100,000 U.S. citizens in an average community there are:

- a. 1100 under age 65 with angina, post myocardial infarction status or cardiovascular insufficiency due to coronary disease. Many more over this arbitrary age limit.
  - of an acute myocardial infarction each year of all ages.
  - III ages with significantly limiting angina pectoris.
  - Living post coronary bypass patients - depending on

EXERCISE PROFESSIONALS IN  
EXERCISE TESTING AND TRAINING

Physicians                           Blair D. Erb, M.D.

Physiologists                       Neil B. Oldridge, Ph.D.

Other Professionals               Kathy Berra, B.S.N.

THE ROLE OF THE PHYSICIAN  
IN CARDIOVASCULAR HEALTH PROGRAMS

Blair D. Erb, M.D.

I. Introduction

Medical care in the United States has traditionally focused on acute care. Technology, especially as applied in the hospital, has succeeded in defining and treating the anatomic, biochemical, and immunologic abnormalities recognized as disease. Although evident in the care of many illnesses, this is most dramatically demonstrated by the hemodynamic emphasis on diagnosis and the surgical approach to treatment of coronary artery disease.

The acute care system, stimulated by interest in prevention and rehabilitation, is beginning to recognize the need for sufficient attention to the functional status of the individual, in both the well state and in the state of illness. Determination of the functional status (and modification when appropriate) is evolving as a useful clinical tool in both illness and wellness.

II. The Wellness-Illness Cycle

The margins of health and illness are not sharply defined. At one extreme is health and at the other pole is illness. Between these poles are different degrees of wellness and illness. The wellness-illness cycle demonstrates progression through the indistinct interface between these extremes (Figure 1).

The well subject, by reason of certain characteristics, may be vulnerable to disease. Prior to the onset of symptoms, significant disease may be present. Symptoms, however, alert the subject to enter the acute care system. The degree of recovery may vary among individuals, but may be modified by rehabilitation efforts.

Preventive efforts focus on delay of onset and progression of disease by identifying the vulnerable individual at earlier stages in the cycle. Rehabilitation efforts are intensified at the outcome point of the cycle for optimal return to function.

III. The Illness-Wellness System

Distinguishing features of the Illness System and Wellness System have been defined. Unwritten in this definition, however, is the absolute need for the medical profession, because of its training in disease and authority to interpose therapeutics, to provide an authoritative basis for program development, especially in matters related to disease.

On the other hand, other health professionals, by virtue of training, certification, or licensure, function in their appropriate roles in the system for prevention and rehabilitation and in support of the acutely ill.

\*e accountable to standards for quality assurance estab-  
Such standards have been less stringent in those working

in the wellness system than in those in the illness system partly because of the vastness of material and heterogeneity of services. It remains, therefore, imperative that the system responsible for treatment of the ill provide basic principles of concern for all health professionals in matters of prevention and rehabilitation.

#### IV. Work Physiology as the Common Discipline

A search for the common denominator among the many clinical disciplines using the principles of physical activity focuses on the functional status of the individual.

The essence of the functional state of the individual is defined by the scientific discipline of Work Physiology (see block figure and ACP statement). This broad discipline addresses health, physiological, psychological, motivational, and environmental factors of the individual in action. Ergonomics, the interaction at the man-machine interface, reflects the efficiency of the system.

When applied to clinical medicine, this physiological function must be tempered by the art of medicine calling into play those features of personal need which make up the complex constellation of features called "state of health."

#### V. Medical Involvement According to Subject Category

When a physician is called upon to provide advice regarding physical activity, whether in the tasks of daily living, occupation, recreation, or for health enhancement, his advice should be based on the best scientific principles available. Increasing medical responsibility is apparent as one progresses from low level activities in low risk subjects to high intensity activities in high risk subjects.

It helps to place the roles and responsibilities in numerical perspective by looking at a distribution curve of the target population, services anticipated, and intensity of responsibility by medicine (Figure 2).

However, the principles of understanding the complexity of interacting needs, illnesses, and goals of the individual must be woven into the personal care by the physician.

#### VI. Cardiac Rehabilitation

Cardiac rehabilitation, therefore, involves not only traditional patterns of care but also focuses on features which may modify symptoms or recurrence of disease. It remains to be seen whether exercise or modification of other factors or a combination of all features is responsible for enhanced cardiovascular health.

Sufficient evidence has been available, however, to warrant a major investment not only in programs, but in facilities in other countries, most notably Germany and eastern European countries.

In the United States, where the emphasis has been on programs instead of bricks and mortar, a recent survey indicates 533 programs in cardiac rehabilitation are claimed to exist.

VII. The Role of the Physician

The physician, because of his background in basic sciences and broad perspectives of the needs of the individual, based on a foundation of training in disease states, must assume his role of ultimate responsibility to health.

These responsibilities apply not only to the individual, but also to the profession, the community, and to the program (see Figures 3, 4, 5, 6).

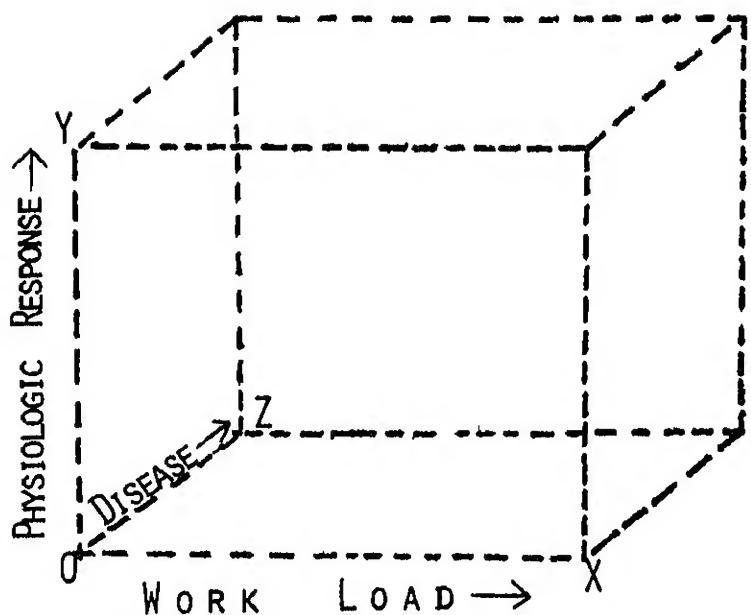
VIII. Conclusion

It is the physician's goal, therefore, to provide the basis for secure, sound, safe, and effective measures with the aid of appropriate health professionals to maintain or return the individual to the optimal physical, psychological, and social function important to his quality of life.

IX. The Challenge

The challenge is offered to this meeting of health professionals from varying backgrounds and to physicians especially from various subspecialties to continue the dialogue focused on the common denominator for optimal health services and fuse together the illness and wellness arenas. The common denominator appears to be the scientific discipline of work physiology (Figure 7).

## WORK PHYSIOLOGY



P H Y S I O L O G I C   R E S P O N S E S   ( Y )  
T O   W O R K   L O A D   ( X )  
M O D I F I E D   B Y   D I S E A S E   S T A T E S   ( Z )

THE AMERICAN COLLEGE OF PHYSICIANS  
MEDICAL PRACTICE COMMITTEE

STATEMENT ON EXERCISE

When a physician is called upon to provide advice regarding physical activity, whether in daily living, occupation, recreation, or for health enhancement, his advice should be based on the best scientific principles available. Work physiology, as applied to cardiology, pulmonology, rheumatology, or other clinical fields, defines the functional status of the individual in his environment and factors which may modify that status.

It is the physician's responsibility to provide an objective interpretation of existing knowledge in light of the patient's situation. Pertinent reference sources, texts, and journals found in the American College of Physicians "Library for Internists" include:

Texts

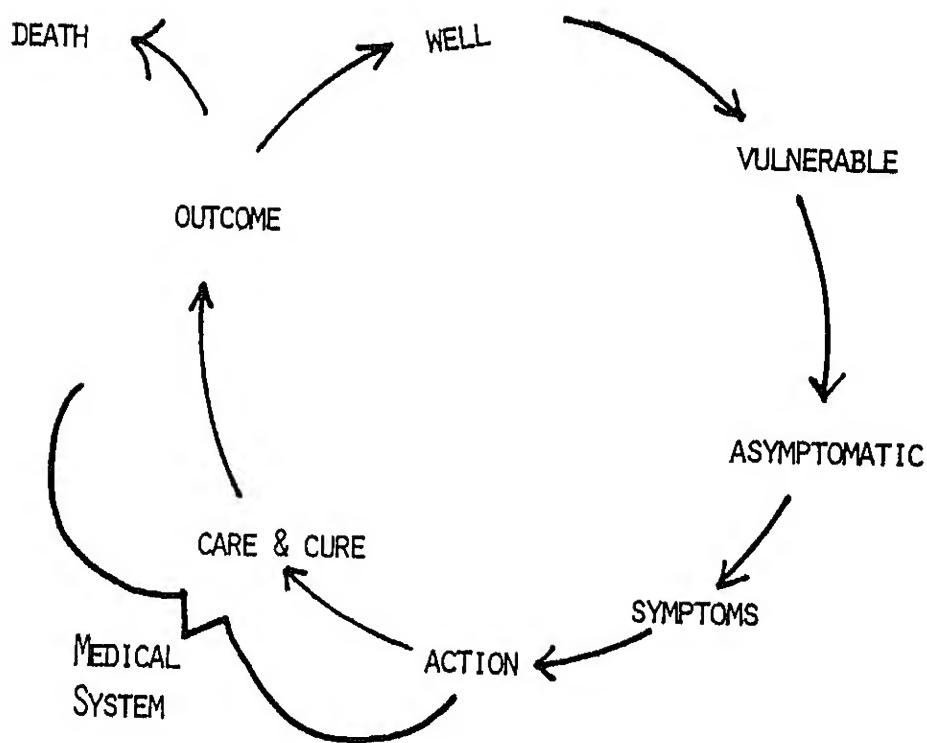
1. Textbook of Work Physiology. 2nd ed. Astrand PO, Rodahl K. McGraw-Hill Book Company, New York, 1977.
2. Exercise in Cardiovascular Health and Disease. Amsterdam EA, Wilmore JH, DeMaria AN (eds.) Yorke Medical Books, New York, 1977.
3. Men at Work. Applications of Ergonomics to Performance and Design. Shepard RJ, Charles C. Thomas, Publisher, Springfield, Illinois, 1974.
4. Exercise and Heart Disease. Sonnenblick EN, Lesch M (eds.) Grunne & Stratton, New York, 1973.
5. Exercise Testing and Exercise Training in Coronary Heart Disease. Naughton J., Hellerstein HK (eds.) Academic Press Incorporated, New York, 1976.

Journals

1. Circulation
2. The American Heart Journal
3. The American Journal of Cardiology
4. Journal of Applied Physiology
5. American Journal of Physiology
6. Journal of Medicine and Science in Sports

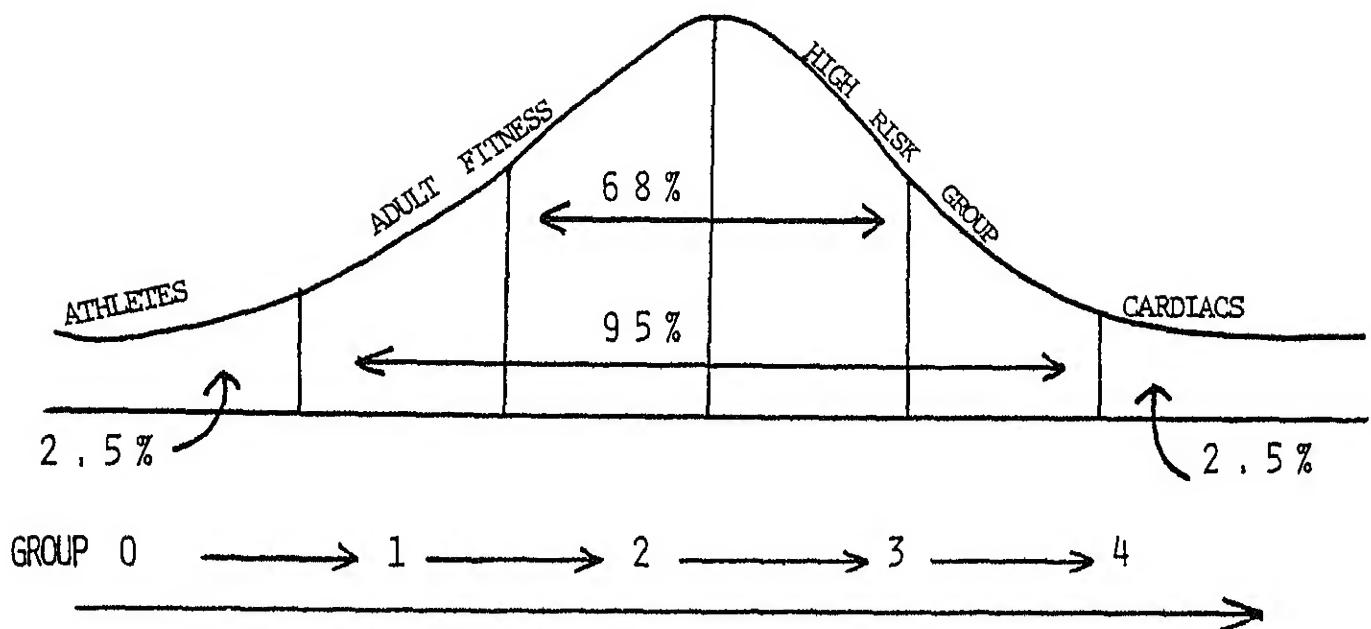


## WELLNESS - ILLNESS CYCLE



(Figure 1)

DISTRIBUTION CURVE FOR  
EXERCISE GROUPS



INCREASING MEDICAL RESPONSIBILITY

CLASSIFICATION OF SUBJECTS

- |         |   |   |
|---------|---|---|
| GROUP 0 | = | COMPETITIVE ATHLETES IN TRAINING  |
| GROUP 1 | = | WELL SUBJECTS <u>UNDER</u> AGE 35   |
| GROUP 2 | = | WELL SUBJECTS <u>OVER</u> AGE 35  |
| GROUP 3 | = | SUBJECT OF ANY AGE WITH SIGNIFICANT CARDIO-VASCULAR RISK FACTORS OR ASSOCIATED DISEASES |
| GROUP 4 | = | SUBJECTS WITH PROVEN CARDIOVASCULAR DISEASE   |

(Figure 2)

THE ROLE OF THE PHYSICIAN  
IN CARDIOVASCULAR HEALTH PROGRAMS

RESPONSIBILITY TO THE PROFESSION

1. To encourage research in the pathophysiological processes of daily activities and factors which modify these responses.
2. To develop guidelines for healthy habits and safe activities in daily living.
3. To provide principles for effective and safe programs in prevention and rehabilitation in cardiovascular disease.
4. To provide standards for credibility of programs recommended to the public.
5. To develop mechanisms for communication and professional education among physicians emphasizing the functional status of the individual.
6. To develop mechanisms for incorporating these functions into the medical system.

(Figure 3)

THE ROLE OF THE PHYSICIAN  
IN CARDIOVASCULAR HEALTH PROGRAMS

RESPONSIBILITIES TO THE COMMUNITY

1. To encourage community programs in prevention and rehabilitation.
2. To serve in advisory capacity to community health programs.
3. To identify and contribute reliable educational resources concerning factors related to illness.
4. To participate in the medical component providing professional and laboratory services to community programs.
5. To participate in hospital related services.

(Figure 4)

THE ROLE OF THE PHYSICIAN  
IN CARDIOVASCULAR HEALTH PROGRAMS

RESPONSIBILITIES TO THE PATIENT

1. To provide insight into the principles of cardiovascular health.
2. To advise the individual concerning the status of his personal health.
3. To relate the personal health status with physiological requirements of daily activities, recreation, and occupations important to the individual's quality of life.
4. To supervise exercise testing when appropriate.
5. To introduce the patient to an appropriate educational and exercise program.
6. To provide medical supervision for appropriate therapeutic cardiovascular health programs.
7. To monitor results of behavioral and physiological changes.

(Figure 5)

THE ROLE OF THE PHYSICIAN  
IN CARDIOVASCULAR HEALTH PROGRAMS

RESPONSIBILITIES DURING THERAPEUTIC EXERCISE SESSIONS

1. To observe the patient's performance during exercise.
2. To evaluate symptoms.
3. To evaluate drug effects and recommend changes when appropriate.
4. To assess progress of disease.
5. To determine when catheterization, myocardial imaging, or repeat exercise testing should be done.
6. To counsel the patient and give psychological support.
7. To maintain patient discipline.
8. To maintain discipline among health professionals.
9. To assist in emergencies and cardiopulmonary resuscitation.

(Figure 6)

WELLNESS - ILLNESS CYCLE

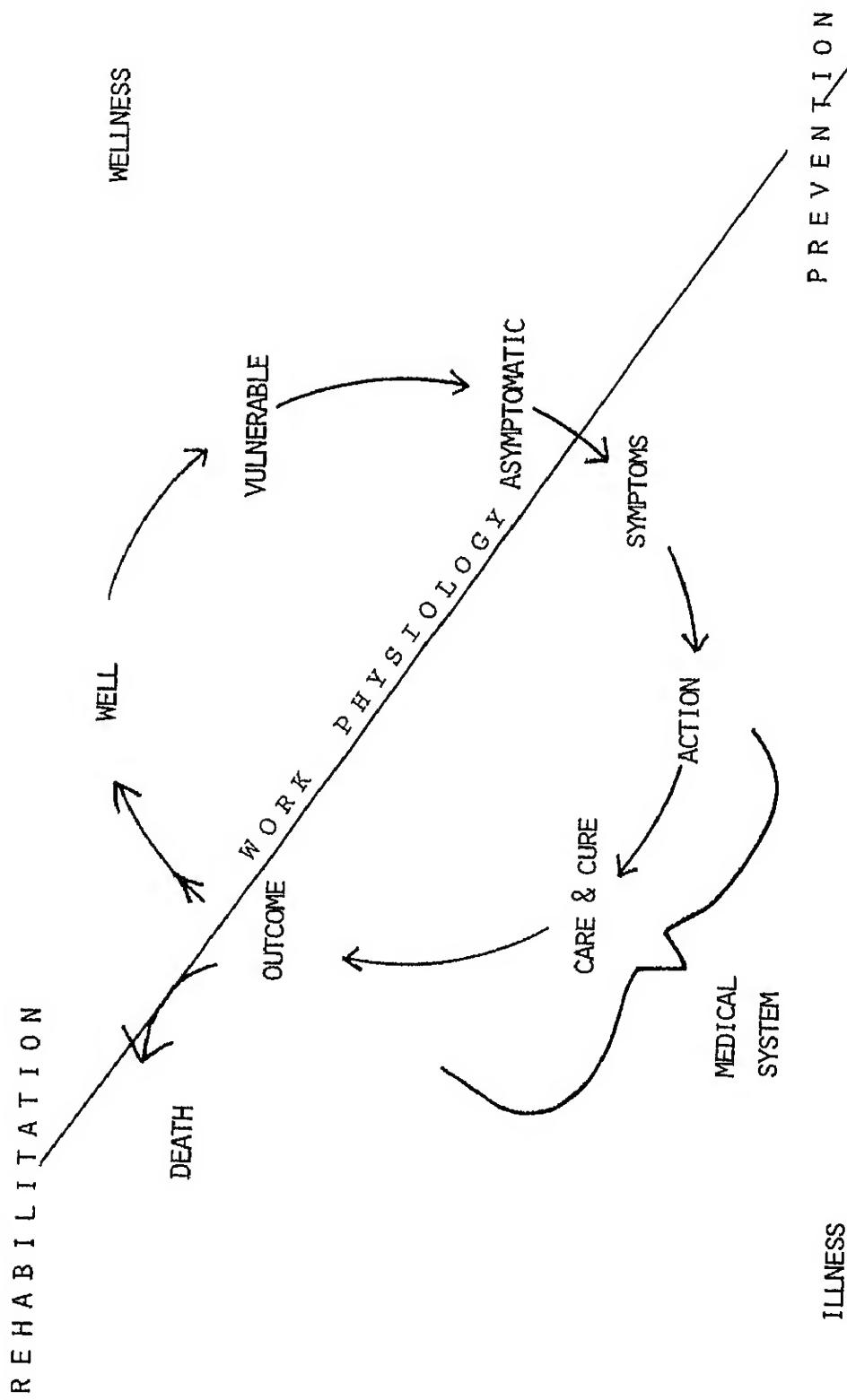


FIGURE 7

THE ROLE OF PHYSIOLOGISTS IN EXERCISE  
TESTING AND TRAINING

American College of Sports Medicine Certification Program

Neil B. Oldridge, Ph.D.

The title of this conference - Alternatives in Cardiac Care: Prevention and Rehabilitation - reinforces the realization that we do have alternatives. I would like to add my recognition to the American Heart Association for their interest displayed in this area not only as an individual, but as a member of the American College of Sports Medicine and in particular as a member of the A.C.S.M. Preventive/Rehabilitation Exercise Program Committee. It is unfortunate that many of us do not take advantage of the former alternative - prevention - but wait for the prescribed imposition of the latter alternative - rehabilitation. J. M. Morris (1978) suggests that education may well be the crucial inequality resulting in disproportionate use of health-care systems. There is a growing awareness of and concern for health promotion and enhancement at all ages from the pre-school child to the senior citizen. Perhaps this conference on Prevention and Rehabilitation should have included a section for young people.

The American College of Sports Medicine is a strong advocate of the position that individuals "benefit throughout life from being active, both regularly - and suitably" and is committed to the generation and dissemination of knowledge in a number of areas including "prevention and rehabilitation in chronic and degenerative disease." Coronary heart disease - premature death and disability in particular - and the various cardiovascular complications of hypertension constitute a major public health problem in North America. Regular physical activity is considered by many to play an important role in sound primary prevention or health promotion programs. The American Heart Association Subcommittee on Rehabilitation Target Activity Group has developed Standards for Cardiovascular Exercise Treatment Programs for use in the rehabilitation of individuals with heart disease, standards based on the knowledge that exercise is considered by many to be an important therapeutic tool for improving the cardiovascular health of those who are known to have heart disease (Erb et al 1979). Dr. Erb has discussed the Interaction between physician and physiologist; I am going to take a page out of Dr. Fox's book and diverge somewhat from my assigned topic. Although I am not going to discuss specifically the physiologist's role, overall competency of personnel involved in exercise, whether diagnostic, prescriptive or therapeutic, is to a large degree based on a sound understanding of exercise physiology, its principles and concepts. The understanding of these principles and concepts of exercise physiology are vitally important in the clinical application to exercise testing and prescription.

The American College of Sports Medicine "Guidelines for Graded Exercise Testing and Exercise Prescription" published in 1975, with a revision slated for Spring 1980, outlines the principles and application of exercise testing and exercise prescription procedures for the entire population with an emphasis on cardiac rehabilitation. During the development of these Guidelines, it became apparent that there was a "need to both (1) stimulate qualifications of all involved personnel and (2) establish means whereby the public

consumer can recognize professional competence" (Fox, 1977). A Certification Program evolved logically following the acceptance of a responsibility to establish means for recognition of professional competence. While it is apparent that similarities exist between primary prevention and rehabilitation and secondary prevention exercise programs and that concepts, personnel and facilities might be shared, the focus of the American College of Sports Medicine's Certification Program is directed toward certification of personnel responsible for patients with medical and physical limitations, in particular those who have been referred to cardiac exercise rehabilitation programs.

The certification examination is designed to evaluate competencies of individuals at each of the three levels of responsibility in exercise rehabilitation programs, i.e., the exercise program director, the exercise specialist and the exercise test technologist. The primary thrust of the certification program is directed toward the allied health professional, and as such, it was not considered appropriate for the College to evaluate physician competence as a sports medicine practitioner; the interest is rather to evaluate the competencies of the interested physician as an exercise program director, exercise specialist or exercise test technologist, and in fact, physicians have been certified at each of the three levels of responsibility. The goal of certification is to provide some standard of quality control and so assist both the physician and the allied health professional to better understand the responsibilities of each member of the team within the appropriate supervisory requirements of local medical practice acts (Fox, 1977).

There is an increasingly greater scope, as well as more demanding standards of competency, at the three levels of certification starting with the exercise test technologist through the exercise specialist to the exercise program director. Each level includes the expectations made of the preceding level although certification at the preceding level is not mandatory; during evaluation of the program director, competencies expected of the exercise specialist and exercise test technologist may also be evaluated. The competencies being evaluated at the respective levels are summarized as follows:

#### Exercise Test Technologist

The primary responsibility of the exercise test technologist is to assist in the safe administration of appropriate graded exercise tests in order to obtain reliable and valid data. The exercise test technologist should demonstrate knowledge appropriate to perform tasks such as preparing a patient for graded exercise testing, administering the tests safely, recording and summarizing data, and communicating the test results to the appropriate program personnel. No specific prerequisite work experience or level of education is required, but study or job experience in the fields of the biological sciences, physical education, and health related professionals are examples of appropriate training and experiences for those applying for certification.

#### Exercise Specialist

The exercise specialist must demonstrate competence in exercise testing, prescription and leadership in programs for participants with medically diagnosed disease or limitations, in particular outpatient therapeutic and cardiac rehabilitation programs (Circulation 59:1084A, 1979). The unique competency of the exercise specialist is the ability to lead exercise for persons with medical limitations, especially cardiopulmonary and related diseases, as well as being able to lead exercise for healthy asymptomatic populations. In addition to these competencies and in conjunction with the exercise program director or

physician, the exercise specialist should be able to assist in the education of patients and the community at large. The exercise specialist should have training in exercise physiology and other related areas. An internship of at least 6 months in rehabilitation exercise program is required before applying for certification.

Exercise Program Director

The Exercise Program Director, in addition to meeting the behavioral objectives outlined for the exercise specialist and exercise test technologist, must demonstrate competency in designing, implementing, and administering preventive and rehabilitative exercise programs, including safe exercise testing, executing accurate exercise prescription, and leading of an effective exercise program. The program director will generally have a doctoral degree. In order to qualify as an exercise program director certification candidate, an internship of at least one year in a cardiac rehabilitation program is required. The internship should be under the supervision of a certified program director or a physician and provide opportunities to obtain competencies in administration, program leadership, laboratory procedures and exercise prescription.

The Certification Program has resulted in some 895 persons being certified by 1979:

Exercise Program Director	-	95
Exercise Specialist	-	157
Exercise Test Technologist	-	643

Certification of program directors, exercise specialists and exercise test technologists will be held at a number of diversely located sites throughout the U.S. and Canada in 1980. Certification is an on-going venture still in its developmental stages, and where and when necessary the certification process will be up-dated to meet changing expectations and standards as well as the changing needs of individuals applying for certification. As in established programs there are problems; we expect to solve these problems and to be able to offer a more suitable certification program. The American College of Sports Medicine has taken the initiative in terms of identifying individuals who are competent in this particular area of exercise, and there are a large number of individuals in this room who have been involved in the certification program. If I may identify them as they are seated: Blair Erb, Sam Fox, Loring Brock, Henry Miller, Tom Miller, Jim Skinner and if I have left anybody out, I apologize. Kathy Berra has expressed interest in becoming involved.

What of the future? I think that is the question we need to ask ourselves now. There are a number of issues which could be discussed. However, I would like briefly to bring up one major issue which needs to be raised and hopefully discussed in the workshop groups following this session of the conference.

Exercise and prevention of coronary artery disease. Interim results of exercise rehabilitation and reduction of the recurrent myocardial infarction rate in one of the two major North American studies on the efficacy of exercise rehabilitation have been published (Ontario Exercise Heart Collaborative Study Group, 1979). These results would appear to substantiate the lack of a positive effect of exercise on recurrence of myocardial infarction reported earlier (Wilhelmsen, 1975). As mentioned earlier, however important rehabilitation may be, prevention of cardiac disease, particularly at the pediatric or school-age level, is perhaps an important long-term issue. Considerations for

better education and hopefully increased prevention of cardiac disease at the school-age level should be included in any future effort such as this, as suggested in the drafts of the conference entitled "Preventing Disease/Promoting Health" sponsored by H.E.W. in Atlanta during June, 1979.

While A.C.S.M. has as yet not focused on certification of persons involved in exercise programs designed for the apparently healthy individual or those at low risk of heart disease, there may be a need to direct future energies in this direction. The Y.M.C.A. has long recognized the needs for standards of competency in their own exercise programs and have extensive programs of certification at various levels of expertise.

There are increasingly large numbers of North Americans exercising in health spas, health clubs, community facilities, country clubs, and other recreational clubs as well as on their own. Are there means whereby the public is able to recognize professional competence? Should there be standards whereby the public has at least some knowledge of the credibility of the program and the competency of its personnel? If there are standards, who sets those standards? The American Heart Association Sub-committee of Rehabilitation - Target Activity Group - has suggested that there are common standards for programs of primary prevention, but how does the public have any knowledge of whether these standards are being achieved or maintained? For example, is it possible, as suggested by the American Heart Association (Erb et al., 1979) for every exercise program "involving patients with cardiovascular disease or subjects at risk, such as adult fitness programs, maintenance programs. . . (to) have the proper equipment and drugs for evaluating and correcting life-threatening dysrhythmias"? If an exercise program does not meet these standards, and I estimate that the vast majority of adult fitness and maintenance programs for healthy, low and moderate risk participants do not have personnel either capable of or licensed for operating a defibrillator or giving drugs in order to correct life-threatening dysrhythmias, does this mean that the prospective client should disregard that particular program?

Certainly a proportion of the members of the American College of Sports Medicine involved in adult fitness programs designed primarily as preventive measures have demonstrated a desire for certification and so a means for demonstration of having met certain standards of competency; this may or may not be the case with individuals in organizations such as health spas and other kinds of health clubs. Should there be an avenue for personnel in preventive (adult fitness and maintenance) programs to become certified? If so, who should be responsible for such certification? There are groups who, based apparently on a realization that there is a financial incentive - a potentially large one - in providing a certificate of competence, have become involved in the certification of personnel in exercise programs. Should there be some overall authority over certification in preventive/adult fitness exercise and rehabilitation program? Should this be some group such as the National Commission for Health Certifying Agencies? Perhaps some of these concerns can be discussed at this time or perhaps at some future conference similar to this.

It is encouraging to the American College of Sports Medicine to see acceptance of the certification program; little concern has been expressed by invited representatives of established professional groups such as the American Heart Association, American College of Cardiology, American Medical Association and others about the need, effectiveness, appropriateness and usefulness of the certification programs. The A.H.A. Standards for Cardiovascular Exercise Treatment Programs (Erb et al., 1979) suggest that

certified exercise test technologists, exercise specialists and exercise program directors provide depth to a program. However, this acceptance does not mean complacency; certification implies the constant up-dating of standards, standards that are adequate and in keeping with the state of the art but not such that they promote elitism to the exclusion of workers with experience and interest in a complex field; one cannot expect complete knowledge "across the board" (Fox, 1977). With input from organizations such as those present at this conference and others not present, the American College of Sports Medicine will continue to offer its members and any other interested individuals a certification program which is relevant, appropriate and meaningful.

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THE ROLE OF OTHER PROFESSIONALS  
IN EXERCISE TESTING AND TRAINING

Kathy Berra, B.S.N.

Being identified as representing "other professionals" is somewhat unsettling because I'm not sure who is included in that catch-all phrase, nor do I feel qualified to speak for such a diverse and knowledgeable group. For consideration, however, I would like to offer some thoughts which are shared by many of my colleagues involved in the current practice of cardiac rehabilitation.

Before any person can safely and effectively be "exercise tested and/or trained", he or she must be counseled and educated to understand individual responsibility to the procedure as well as the procedure's responsibility to them. One of my major concerns revolves around the issue of health education and counseling.

Continuing advances in medical care have resulted in shorter hospitalizations following acute myocardial infarction (AMI) and coronary artery bypass graft surgery (CABG). Because of this, patients often are being discharged without adequate or effective teaching and in many cases experiencing grief, anxiety, depression, and anger relative to their "condition." By inadequate training, I don't mean lack of teaching or poor teaching in hospitals; however, in the acute stage of an event, many patients and families are not able to focus on the future because their energies are totally absorbed by the event itself. In view of this fact, we must, as providers of complete health care including cardiac rehabilitation, be aware of these facts and help institute programs which will be available "at the right time." These should include (1) comprehensive information, (2) methods for facilitating change of lifetime habits, and (3) a system to evaluate our effectiveness. For instance, instead of waiting for a patient to ask for information, we should help to stimulate questions which will assure a safer and less anxious recovery process.

Often, professionals in rehabilitation have remarked to me regarding educational and intervention plans that "your population in Palo Alto is so vastly different from ours that we couldn't possibly follow your system." In response to this, I always like to relate my favorite true anecdotes. The first involves a Ph.D. in physics from Stanford who was greatly relieved to be told that the nitrogen he carried in his pocket would not cause an explosion if he fell while carrying it. The second involves a professor who, during a review of the "Anatomy and Physiology" of the heart and what a heart attack is, interrupted to express a real frustration relative to his heart attack. He had been successful all his life and had never known failure; having a heart attack could be tolerated, but he vehemently objected to being told he had an "inferior" heart attack!

I would very much like to see cardiac rehabilitation professionals use standard approaches to the teaching of two critical physical assessment tools easily taught to all cardiac patients which may have the most significant impact on early intervention and possibly less sudden cardiac death. These tools have great importance in the setting of supervised exercise training. They are the assessment of heart rate both for rate and regularity and angina relative to type, intensity, frequency, duration, and triggers. In all of the YMCArdiac Therapy Programs, we emphasize both of these skills.

If patients can assess their own physiological responses to exertion and/or emotion, they will likely make better judgements on whether or not to call for help. More responsible decisions regarding the safety of certain activities also will be made. Loss of control of one's life seems to be one of the major concerns of the acute post myocardial infarction patient between 3 to 11 weeks following hospital discharge. By using teaching tools in rehabilitation programs which give back control, such as those just mentioned, we may be able to significantly impact this aspect of rehabilitation.

May I share with you a summary of philosophy regarding "Exercise Testing and Training" which is shared by many fellow professionals. Exercise alone, whether it's bicycling, biking, swimming, walking, participating in vigorous sports, or running a marathon, is of little value. It will be through total risk factor management that changes in morbidity and mortality will be found. We cannot, as professionals in exercise testing and training, allow individuals to be lulled by a false sense of security relative to exercise and its benefits. As a matter of fact, in our program we have found certain exercises that most of our participants and staff pursue regularly which have fairly large calorie requirements with absolutely no cardiovascular benefits!

In closing, I would like to thank you for your attention and urge you to develop your programs so they are both expandable and exportable by using "other professionals" in all aspects of the rehabilitation process. It is not cost effective and there are not enough physicians available to administer, teach, supervise testing, supervise training, and evaluate progress if we are to make programs of exercise and health education available to every person who requests and requires this highly specialized care. Thank you very much.

SLIDE 1

QUESTIONS COMMONLY ASKED BY PATIENTS FOLLOWING A MYOCARDIAL INFARCTION

HEALTH:

1. How severe was my heart attack?
2. What things should I report to my doctor?
3. What can I expect in terms of future heart problems?
4. How will this change my lifestyle?
5. Why did I have a heart attack? Will I know if I'm having another heart attack?

WORK AND ACTIVITY:

1. Will I have to change jobs?
2. When can I drive a car?
3. Can I climb stairs?
4. When can I return to work?
5. When can I resume sports?
6. How much physical activity can I do? Can I climb hills? Can I garden?
7. When can I resume sexual activity?
8. Will exercise reduce my chance of having another heart attack?

DIETS:

1. Do I need to lose weight?
2. Is cholesterol really important?
3. How can I follow a diet when I travel as much as I do?
4. What about coffee, alcohol?
5. How can I make my low salt diet more palatable?

OTHER:

1. Can I fly in an airplane?
2. Will I be able to keep my pilot's license?
3. Can I go to the mountains for a vacation?
4. Should I be checking my pulse?
5. How can I reduce the stress and tensions in my life?
6. Should I wear a medic alert bracelet?
7. What are my medications for?
8. Should my family learn CPR?

As we all know, medication sheets outlining purpose, side effects, and special instructions are much more valuable than "take this pill each morning, it's good for your heart."

SLIDE 2

Name: LANOXIN (DIGOXIN\*)

Purpose:

This medication helps to regulate the heart rate and makes the heart beat stronger.

Possible Side Effects:

1. Loss of appetite.
2. Nausea.
3. Vomiting.
4. Blurred or dimmed vision.
5. Any sensation of the heart beating irregularly, too fast or too slow.
6. Increased shortness of breath.
7. Swollen or puffy feet and legs.
8. The need to sleep propped up on more pillows than usual.

If you develop any of these problems, call your doctor.

Note:

Digoxin is best taken the same time each day. Take your pulse before each dose of digoxin is due. Because digoxin slows the heart rate, it should not be taken if your heart rate is less than \_\_\_\_ beats per minute. Check with your doctor about further instructions. If you forget to take your digoxin one day, do not take two pills on the next day.

Your Prescription of this Medication:

Take \_\_\_\_ pill(s) \_\_\_\_ times a day.

\*Generic name

SLIDE 3

HEART RATE ASSESSMENT

1. Length of Time
2. Location
  - A. Carotid
  - B. Radial
  - C. Temporal
3. Targets
4. Abnormal Heart Rhythms
  - A. Description
  - B. Identification
  - C. Triggers
    - (1) Coffee
    - (2) Alcohol
    - (3) Emotions
    - (4) Smoking
5. Action Plan
  - A. Count for 1 full minute.
  - B. If greater than 6/minute, count for 2 more consecutive minutes.
  - C. If consistently greater than 6/minute, contact physician.
6. Treatment Controversy
7. Review of Antiarrhythmics

SLIDE 4  
SELF-MONITORING SKILLS

- A. ANGINA
  - 1. DESCRIPTION
  - 2. TRIGGERS
    - (A) EXERTION
    - (B) EMOTION
    - (C) EATING
    - (D) EXPOSURE TO COLD
    - (E) "SPONTANEOUS"
  - 3. GRADING SYSTEMS
  - 4. ACTION PLAN
    - (A) REST
    - (B) NTG
    - (C) RULE OF "3 X 3"
  - 5. PROPHYLACTIC PLAN
    - (A) NITRATES
    - (B) "PLAN AHEAD"
    - (C) OTHER ANTI-ANGINAL MEDICATIONS
  - 6. ANGINA VS. HEART ATTACK
  - 7. CPR - FOR PATIENT AND FAMILY

SLIDE 5

	(Purported calorie-burning equivalent)
Jogging your memory . . . . .	125
Beating around the bush . . . . .	75
Climbing the walls . . . . .	150
Passing the buck . . . . .	25
Throwing your weight around . . . . . (depending upon weight)	50-300
Wading through paperwork . . . . .	250
Sticking your neck out . . . . .	175
Chewing nails . . . . .	200
Making mountains out of molehills. . . . .	500
Dragging your heels . . . . .	100
Pushing your luck . . . . .	250
Climbing the ladder of success . . . . .	750
Wrapping it up at day's end . . . . .	12
Sidestepping responsibilities . . . . .	100
Bureaucratic shuffle. . . . .	125

EXERCISE TESTING AND TRAINING SETTINGS

In-Hospital Program. .... Gerald F. Fletcher, M.D.

Free-Standing Centers. .... L. Loring Brock, M.D.

Community Facility ..... Donald G. Pansegrau, M.D.

## IN-HOSPITAL PROGRAM

Gerald F. Fletcher, M.D.

The program for the next three speakers on the Alternatives in Cardiac Care will touch on testing and training in three different areas. The first discussion will be the in-hospital program where the activities employed are within the hospital before the discharge of the patient-either post-bypass or post-infarction. As has been mentioned earlier, the in-hospital program for either of these groups of patients is very important with regard to the educational aspect. Education with regards to physical activity (and testing) along with the total risk factor modification process should be included.

It is important to consider the definition of exercise and not confine exercise testing or training to a fast moving treadmill for testing or to fast running for training. Exercise has many variables with regard to how people may enjoy physical activity - be it bicycling, swimming, walking or utilizing recreational activities which are hemodynamically stimulating. In addition, exercise testing does not necessarily incorporate only the treadmill. It may refer to a low level bicycle test, a step test or, as some conservatives still do, just "walking up and down the hall," perhaps with telemetry monitoring to assess the resultant heart rate.

In the hospital setting we must remember that the referral of the primary physician plays an important role. There are forms to explain specifically how the physical activity program is done in a hospital setting with regard specifically to physical therapy, progressive daily activities, self-grooming, walking, etc. It is important to discuss some exercise activities that prepare a patient for an out-patient program which may begin as early as 6-7 days post-bypass or as early as 7 or 8 days post-infarction. Often these things must be done very rapidly, and I feel the nurses (Ms. Berri and others who are involved with this) can provide more details as to how we do this efficiently via group activities or individual one-on-one education and activity protocol designs.

Most programs, I am sure, have some type of "circular wheel activity" of procedure with regard to recreational, physical therapy activities and education in various step forms. We have progressed from 14 step programs down to seven and eight step programs, and these must be varied according to the patient and his cardiac status - that is post-bypass or post-infarction, and all of these must be altered according to the progress of the patient. We can simultaneously progress exercise and activities of daily living, i.e., activities of self-grooming, use of bedside commode, passive exercises, active exercises, sitting in chair, etc. Again, they have to be done in accord with the patient's progress in either of these cardiac states. We must deal with the "total patient," and the total risk factor modification. The activity and exercise component seems to be a catalyst for this, and patient enthusiasm is frequently engendered along these lines.

In our early results\* at Baptist Medical Center in Atlanta several years ago we acquired follow-up data on 151 patients who had been seen in our program. These were post-infarction patients, and we contacted them at a mean of thirteen months post hospitalization. The 85 percent from whom we were able to retrieve information gave us an optimistic feel for the value of inpatient activity modification, risk factor modification, etc. The number totaling 75 that were contacted regarding exercise revealed that about

half of these were doing some regular exercise. The weight loss was appropriate in about 49 percent of those that we were able to contact. About half were back at work. High blood pressure education apparently did rather well because most that had been hypertensives were controlled (91 percent). Smoking control was good. This also is true in the supervised outpatient programs. As you are able to keep patients in a physical activity program with the catalyst and interest of exercise, they will frequently avoid tobacco.

More current things (and some of this will be presented in more detail in the AHA scientific sessions\*) involve evaluation of in-patient activities. With the interest and help of Barbara Johnston, M.N., our nurse coordinator, we looked at the patient's various responses to bed bath, tub bath, and shower. This has been done in normal people but, to our knowledge, has not been done in post-infarction patients. To study this we utilized measurement of oxygen consumption with a Max Planck respirometer. Various baths were studied with expired air collection and subsequent oxygen consumption calculations. Before and after bathing EKGs are now being analyzed. If one looks at oxygen consumption for shower, bed bath and tub bath it is clear that the oxygen consumption measured by this technique was significantly more notable with a shower. The rate pressure product in addition was slightly but significantly greater, and this is comparable to data that people have reported in normal patients. This type of information gives us clinical guidelines and data one can apply to patient management. The shower, indeed does require more oxygen consumption and, may be more of a risk from the cardiac standpoint in the post-infarction state.

We also have looked at (and I am glad Dr. Fox mentioned this earlier) predischarge exercise testing\* which is an area that we must analyze carefully. Current information in the literature (and the press has recently capitalized on this) implies that exercise testing is not very helpful. Certainly with the ST segment analysis only, this could well be true. However, predischarge exercise testing in selected patients, both bypass and post-infarction, has in our hands been very helpful. We do not feel that every patient, who is about to go home, should be tested. However, in selected patients, careful testing with proper examination by a physician and nurse and proper monitoring of the blood pressure, work load and the electrocardiogram can be very beneficial.

We have studied 20 post-infarction patients before hospital discharge with a low level test\*. Testing was at mean time of 14 days post-infarction. During testing two developed premature atrial beats and premature ventricular beats. One had ST segment changes of ischemia. The oxygen consumption ranged from 7.7 to 24 ml/kg/min with a mean of 13, which is a reasonable oxygen consumption at the MET level at which we usually like to send patients home. Their heart rate attainment on the bike test of about 120 beats per minute was much less than they had been doing in the hospital either walking up and down one or two flights of stairs or up and down the hall. Several findings that were of interest were that two patients developed ventricular gallop sounds after exercise. One had an increase in a systolic murmur, and two failed to elevate their blood pressure with testing. One of these with ventricular ectopic beats on Holter monitor in conjunction with ventricular ectopic beats on exercise testing (with poor blood pressure response) died two weeks later at home.

A person who is able to attain about 120 beats per minute on the testing mentioned and who is able to reach the oxygen consumption level of about 13 or 14 ml/kg/min. is functioning at the 3 to 4 MET LEVEL that Dr. Fox alluded to earlier. Of course we

cannot recommend all activities at this MET level to every one. Some people cannot play softball, and some do not like to dance, but many activities at this MET level are quite safe and enjoyable for post-infarction patients in the early phase.

Dynamic EKG recording (Holter) is another aspect of in-patient evaluation that warrants comment. As another test for evaluation prior to discharge the Holter monitor is of more benefit with regard to arrhythmia detection. We have studied nine patients with both exercise testing and the Holter monitor. Two who had problems with exercise - (that is gallop rhythm after exercise with S-T segment changes) - had higher grade arrhythmias with Holter recording. This finding is consistent with other similar studies. The in-patient rehabilitation team with a nurse evaluator asking the primary physician to relate his feelings on selecting certain patients for either or both of these tests has been an effective mechanism for enhancing patient care in this area.

Amsterdam et al\* from Davis have reported 54 patients, 2-4 weeks after infarction, while they were still in the hospital. They did exercise tests on all. Tests were positive in 30 percent. All of these had cardiac catheterization as well, and most had multi-vessel disease. They feel that this type testing is beneficial and a safe basis with which to prescribe activity, and it identifies patients with multi-vessel disease. The group at Stanford\* studied 96 male post-infarction patients with treadmill exercise and ambulatory monitoring at 3 and 11 weeks and 6, 9 and 12 months. The 3 week test was done before discharge. They found somewhat comparable information with both of these tests. Complex ventricular ectopic activity increased significantly from 3 to 11 weeks. The treadmill induced ST changes were not associated with increased ventricular activity, and the complex ventricular ectopic activity was comparable in both tests.

Consideration of both tests before patients are dismissed is important. Again we emphasize exercise testing but dynamic EKG (Holter) recording often records exercise. You frequently are recording people the day before they go home while they are doing their activities of daily living. They are walking (maybe 50 ft.) up and down the hall and perhaps up and down two flights of stairs (8 steps per flight). How do you compare these tests? Several points should be made. The work load for an ambulatory recording is quite variable. We are able, however, with an exercise test to examine the patient before and after. (I think this is very important in people with coronary artery disease.) Gallop rhythm, dyskinetic areas, systolic murmurs (mitral regurgitation) are found in a notable but small group of people. The time monitored, of course, is limited in the exercise test, but the ambulatory recording is extended to at least 24 hours. Professional observation is done with the exercise test, but not with the Holter monitor. Subjective data is as important with the exercise test as with the dynamic EKG, and I am not really impressed by the validity of diaries. I think patients tell us a great deal in diaries that is not verified electrocardiographically and vice versa. The persons who record they are "having some tachycardia" timed at 11:03 a.m. frequently are having only a sinus tachycardia of 110 BPM. To the contrary, those who have ventricular tachycardia of 180 BPM and then back to sinus rhythm frequently say they "feel fine".

Lastly, we recommend certain out-patient activity schedules, and the level for the post-infarction group is usually not quite as accelerated as for the post-surgical patient. Our activity schedule is modified from Dr. Jack Boyer in San Diego, and this is our most recent update of about two weeks ago. The more accelerated program is utilized with the good risk infarction patients (in the category of a seven day admission) or the post bypass

patients who are often going home in 6-7 days. They do not need a great deal of supervision and may progress quite rapidly.

Summary Comments

Exercise testing and training has an important base in the hospital. The test is not necessarily needed on everyone, but the education about the test, what it means and what it is for in the post-infarction or coronary bypass group is very important. Sometimes this has to be done very quickly because the patients are often discharged in six to seven days. The exercise test is not done just for the S-T change on EKG, but for arrhythmias, blood pressure response, heart rate response, for the subjective feeling you have for the patient while he is on the treadmill or on the bicycle and for the psychological response. The latter is very important, but it is difficult to measure or to prove its value.

Exercise training basis begins early in the hospital with activities of daily living, physical therapy and the recreational activities through occupational therapy and recreational therapy departments. These can be begun at a very low level, moderated by the ways we have discussed. This leaves us for the next step that Dr. Brock will discuss after the patient leaves the hospital.

Question: Doctor, were the people in the shower sitting or were they standing?

Answer: They stood.

\*References available on request.

SOME TIPS TO FOLLOW TO SAVE YOUR HEART SOME WORK

General Activities

1. Eat 3 or 4 meals a day. Each should contain about the same amount of food. Don't eat very large meals-eat slowly-don't rush.
2. Try to avoid situations, people and topics of conversation which upset you-make you tense or angry. Your heart works harder when you are angry, tense, or afraid.
3. Avoid being in very cold or very hot temperatures. In the summertime, plan your outdoor activity during the cool of the day. The heat makes the heart work faster. Avoid chilling. If you go out on a very cold, windy day, cover your mouth and nose with a hankerchief and don't take breaths of cold air.
4. Space your activities to allow time for your heart to rest.
  - a) Plan your days and weeks work. Spread out harder tasks-alternate an easy task with a hard one.
  - b) If you get tired, no matter what you are doing, stop and rest for 15-30 minutes. Don't push yourself to clip the hedges, to mow all the grass or to watch the last 45 minutes of that T.V. show.
  - c) Space your activities-don't try to do all your chores in the morning - do some in the afternoon and some in the evening. Rest in between.
  - d) Try not to hurry. Plan your day so that you can get everything done without getting tense and hurried. Don't feel that you must rush to complete the job in a short time.
  - e) Plan a 20-30 minute rest period at least twice a day - once in the morning and once in the afternoon. You don't have to go to bed - just rest.
  - f) Every night, sleep the number of hours which you usually slept before your heart attack - try to get at least 6 to 8 hours of sleep. Do not stay up very late one night and "catch up" the next. However, if you do plan to stay up late, take a nap beforehand.
  - g) Working with your arms above your shoulders is harder on your heart than working with them below shoulder level. Have someone rearrange your cabinets so that things you use often are at or below waist level. If you must have things in high cabinets, place those articles you use most often in the front. Avoid washing windows, hanging clothes on the line and reaching for things above your shoulder level.

THE FIRST WEEKS

For the first weeks at home, continue to be as active as you were on the last day in the hospital. You can do the following things:

1. Get up and get dressed every day.
2. Walk daily. Walk as much as you were walking in the hospital. You may walk outside when the weather is nice but walk on level ground. Plan where you will walk before you go. Avoid steps and hills - they make your heart work harder than walking on the level ground. Avoid walking against the wind because your heart works harder and beats faster then. In the winter, walk in late morning or early afternoon - during the warmest part of the day. In the summer, do your walking in the morning or evening when it is cool. Walk after a rest period or when you are not already tired from another activity. If you have chest discomfort or shortness of breath, stop and sit down on the steps or curb, take NTG if you have some and wait until you feel OK again. Tell your doctor about this pain, when you see him again.
3. If your bedroom is up a flight of stairs, your doctor may suggest that you climb them only once a day and that you take only a few steps at a time and stop and rest.
4. Avoid doing anything which tenses your body

Examples:

- a) straining when having a bowel movement (ask your doctor about a laxative)
  - b) lifting anything heavy - children, groceries, or suitcases
  - c) pushing or pulling anything heavy
  - d) trying to open a stuck window or unscrew a stuck jar lid
5. Activities you can do
    - a) cooking one meal a day
    - b) washing dishes and cleaning up after another meal
    - c) tidying up the bed but not changing the sheets
    - d) washing clothes - put them in the washer but have someone else pull them out and carry them and hang them on the line
    - e) Talking with friends as long as they don't tire you
    - f) walk on flat surface

- h) shoot pool
- i) throw softball (underhand)
- j) ride in car (not driving)
- k) go to relaxing movie or out to dinner (without cocktail)
- l) go to grocery store with wife

6. Activities you should not do

- a) vacuuming
- b) sweeping
- c) heavy cleaning
- d) drive
- e) lift weights or do other isometrics
- f) rake leaves
- g) hoe
- h) work in attic or basement
- i) wash car
- j) play golf or tennis
- k) watch excitable TV or movie
- l) play basketball or football
- m) ride a bike
- n) go bowling

You may be able to do these things after you have been home \_\_\_\_\_.  
Check with your doctor.

AFTER THE FIRST TWO WEEKS

1. You may go to church.

the grocery store for a few things.

you may

go to the movies \_\_\_\_\_  
go to a ball game \_\_\_\_\_  
roll up your hair \_\_\_\_\_

4. You may cut the lawn with a self propelled mower or riding mower. Do this activity with care and in cool weather.
5. When your doctor says you may go back to work, try to arrange to go back part time at first and then slowly increase your working time.

You may have other questions about your activities, diet, medications or illness. If you do, please feel free to ask us.

#### GENERAL ADVICE

1. If you develop pain, numbness, or shortness of breath, stop what you are doing, take your nitroglycerin, if your doctor gave you some, and rest for several minutes. When the discomfort disappears, continue what you were doing but at a slower rate.
2. Try to follow your fat-controlled diet. It is an important part of the doctor's plan for helping reduce your blood cholesterol.
3. Regular coffee with caffeine will increase your heart rate. One to two cups per day is all right unless your doctor states otherwise. Sanka is good to use if you want to drink more than one to two cups.
4. To protect your heart take a daily walk. Slowly increase the distance and time you walk each day as you can comfortably tolerate. Do this until you see your doctor again.
5. Continue the physical therapy exercises started in the hospital until you return to normal activity. You should do these exercises twice daily.
6. After a meal, your heart is already working to digest your food. Therefore, rest for an hour after eating before doing any heavy exercise.
7. Stop smoking cigarettes. Smoking is bad for your lungs and your heart. Smoking cigarettes increases your chance of having another heart attack.
8. Your doctor says you may have \_\_\_\_\_ ounces of liquor a day. Never drink enough liquor, beer, or wine to make you drunk.
9. Check with your doctor before you take a long trip. He will probably want you to wait for at least six weeks before you take a long car trip. When you go, stop every two hours and walk around - this will help prevent clots from forming in your legs.

mountains or to a place where it's very hot and humid. Airplane trips are usually permitted one month after discharge.

10. Your doctor says that you may have sexual relations \_\_\_\_\_ days after discharge. As with other activities or exercise you should not have sex if:
- a) you are tired - take a 30 minute nap first
  - b) you have just eaten a heavy meal
  - c) you have been drinking
  - d) you are angry with your mate
  - e) the temperature of the room is uncomfortably warm or cool.

If you begin to have chest discomfort while having relations, STOP. The next time try taking nitroglycerine before having relations. Remember that it is normal for your heart to beat faster and your breathing to speed up while you are having relations. Your heart beat and breathing should slow down and return to normal shortly afterward.

11. Notify your doctor immediately if you have:
- a) Heavy pressure or squeezing pain in the chest which may spread to the shoulder, arm, neck or jaw and is not relieved in 15 minutes by resting and/or nitroglycerine
  - b) increased shortness of breath
  - c) unusual tiredness
  - d) swelling of feet and ankles
  - e) fainting
  - f) very slow or rapid heart rate

Georgia Baptist Medical Center  
Cardiac Rehabilitation  
Atlanta, Georgia

DISCHARGE ADVICE FOR PATIENTS FOLLOWING CORONARY BYPASS SURGERY

General Activity:

A sensible balance of rest and exercise is the key to a satisfactory convalescence.

1. You should try to get a good night's sleep. Sleeping medication may be used if this is necessary. Plan a 20-30 minute rest period at least twice a day once in the morning and once in the afternoon. You don't have to go to bed - just rest.
2. Space your activities to allow time for your heart to rest:
  - a. You may perform light tasks about the house. If you try to do something that proves to be unduly tiring, stop and rest. Conversely, there is no need to pamper yourself excessively. If you get tired, no matter what you are doing, stop and rest for 15-30 minutes.
  - b. Plan your days and weeks work. Spread out harder tasks - alternate an easy task with a hard one.
  - c. Try not to hurry. Plan your day so that you can get everything done without getting tense or hurried.
3. Go up and down stairs at a comfortable pace. If you become tired, rest before continuing.
4. Avoid lifting, pushing, or pulling any heavy objects initially. After one or two weeks, you may attempt to lift objects weighing up to 20 pounds. If this causes aching or stiffness in your chest, avoid it until some time has passed. Remember that this includes small children!
5. You may bathe or shower as usual after your sutures have been removed. It may be helpful to apply baby oil to the suture line to help soften the crusty material that has built up on the incision. Do this about 15 minutes prior to bathing.
6. You may go for short car rides (up to 30 minutes). On longer trips, stop frequently to walk about and stretch your legs. It is best for you not to drive the car yourself until after your first return visit to Doctor \_\_\_\_\_ . This will be at least 3 weeks after discharge.
7. Try to avoid situations, people and topics of conversation which upset you, make you tense or angry. Your heart works harder when you are angry, tense, or afraid.

Exercises

1. To maintain and/or improve breathing and keep the chest from becoming tight:

lower rib cage and feel the chest expand as you breathe. Slowly take in as much air as possible and slowly breath out as much air as possible.

2. Correct the tendency toward rounded shoulders and slumped posture: Whenever you sit, stand, or walk, keep your shoulders back and spine erect, and don't be afraid to move! You won't damage anything if you do.

3. Physical Therapy:

If you followed a prescribed regimen of physical therapy exercises during hospitalization, continue to follow these exercises at home as explained by the therapist. A list of these exercises will be given to you to use as a guideline. Continue these exercises until you are back to your normal routine.

4. Home Walk Program:

A prescribed program of walking may be given to you to assist in maintaining a regimen of daily exercise. Think of this as a leisure-time activity. Get your family involved! Avoid walking in very cold or very hot temperatures. In the summertime, plan your outdoor activity during the cool of the day. In the winter, participate in outdoor activities during the warm part of the day. Extreme temperatures are not good for your cardiovascular system.

These are guidelines. It is impossible to say how quickly or slowly your strength will return. In most cases, common sense will tell you when you are overdoing things. On the other hand, too little activity can delay the return of muscular tone and stamina.

#### Social Activity

Resume your recreational and social activity slowly at first. Fatigue is the best gauge for regulating these activities. The following guidelines are recommended:

1. No tobacco use in any form. You should also avoid being in the same room with other smokers.
2. You may have alcoholic beverages in moderation not to exceed one drink per day (Consult your physician for long term advice).
3. You may resume sexual relations \_\_\_\_\_.

As with other activities or exercise you should not have sex if:

- a) you are excessively tired
- b) you have just eaten a heavy meal
- c) you have been drinking
- d) you are angry with your mate
- e) the temperature of the room is uncomfortably warm or cool

#### Diet

A prudent diet, recommended by the American Heart Association, is low in cholesterol and saturated fat and is wise to follow after your surgery. The dietitian has provided literature on the diet, including meal planning and recipe tips. This information should also assist you in weight control guidelines; as it is very important to achieve and maintain an ideal body weight.

The diet is an integral part of your treatment and compliance is strongly urged. Please feel free to call your dietitian if any questions arise at home.

Incisional Discomfort:

1. Most chest pain experienced post-operatively is related to the surgical incision and is termed "chest wall" pain. Chest wall pain will diminish in time, but may occur when you over-exert yourself. This pain tends to be accentuated by deep breathing, coughing, sneezing, or sudden changes in body position.
2. The union of the sternum, or breast bone, is a fibrous union and it requires approximately six months for this bone to "knit" together completely.
3. Pain medication may be required. Your doctor will provide a prescription prior to discharge, if necessary.
4. The long incision in your leg was used to remove veins for use as grafts. There may be local fullness and discomfort in this area for some months to come. There may also be some numbness of the skin on either side of the incision. At times small segments of the incision may be slow to heal. You may notice some swelling at the ankle on the same side as the incision because of slight impediment to the flow of blood. This will disappear in time.
5. Report any thick discolored drainage that occurs from either the chest or leg incision. This may be associated with a temperature elevation, so check your temperature before notifying the doctor. It is not uncommon, to have thin, clear drainage from the incision site. This type of drainage does not need to be reported.
6. Most patients experience non-cardiac chest pain related to the incision. This is usually different from the cardiac pain you may have experienced prior to surgery. It is important to distinguish between the two (nitroglycerin will not relieve the pain arising from the chest wall). If you feel that you are having anginal-type chest pain, you may take nitroglycerin to obtain relief. If this anginal pain continues periodically, report it to your doctor.

Work:

How soon you return to work depends on the type of surgery you had, the kind of work you do, and the rate of your convalescence. Because of this variability, your doctor will decide when you can return to work. It may be approximately 8-10 weeks after discharge before plans can be made to return to work.

Medications:

You may receive prescriptions for your medications upon discharge from the hospital. The pharmacist or nurse will explain why these drugs have been prescribed and when they should be taken. Written instructions and drug information that you can take home with you will be provided.

These medications should last until your return visit to Dr. \_\_\_\_\_ . If you find that you will need a refill prior to the first return appointment, please call during regular business hours for prescription refills.

If additional questions arise during your recovery feel free to call the Cardiac Rehabilitation office at Georgia Baptist Medical Center 659-4211, Ext. 2351.

Adapted from:

1. "Some Tips to Follow to Save Your Heart Some Work" - Georgia Baptist Medical Center-Cardiac Rehabilitation.
2. "Discharge Instructions For Patients Following Coronary Bypass Surgery" UNC Memorial Hospital, Chapel Hill, North Carolina.

ACCELERATED  
 CARDIAC REHABILITATION HOME - WALK PROGRAM \*  
 FOR PATIENTS POST - CORONARY EVENT  
 Georgia Baptist Medical Center

Your walking program should approximate a schedule such as:

WEEK AFTER	DISTANCE	ALLOTTED TIME
** Weeks 1 - 2	1/4 mile/day	Leisurely pace of 5 minutes
Week 3	1/2 mile/day	Leisurely pace of 10 minutes
Week 4	3/4 mile/day	Leisurely pace of 15 minutes
Weeks 5 and 6	1 mile/day	Leisurely pace of 20 minutes
Week 7	1 1/4 miles/day	Moderate pace of 20 minutes
Week 8	1 1/2 miles/day	Moderate pace of 25 minutes
Weeks 9 and 10	2 miles/day	Moderate pace of 30 minutes
Weeks 11 and 12	3 miles/day	Moderate pace of 45 minutes
Week 13	4 miles/day	Moderate pace of 60 minutes
Week 14 Continue Indefinitely	4 miles/day	Fast walk of 56 minutes

\* Adapted from John L. Boyer, M.D., San Diego, California

\*\* For the first few days after you get home, walk at a leisurely pace on a daily basis. If, after a few days, you don't feel challenged by walking 1/4 mile/day, i.e. you don't feel tired, you may increase your distance.

Check your pulse rate immediately at the end of every walk. Do not advance to the next stage (as from week 3 to week 4) unless the immediate post - exercise rate is less than \_\_\_\_\_ beats per minute.

The key rule of thumb to remember is... "Listen to your body." If you get tired... stop walking for the day. Advance your distance as you feel ready.

STANDARD  
 CARDIAC REHABILITATION HOME-WALK PROGRAM \*  
 FOR PATIENTS POST-CORONARY EVENT  
 Georgia Baptist Medical Center

WEEK AFTER	DISTANCE	ALLOTTED TIME
Week 1 - 2	In Hospital Regime	
Weeks 2 - 3	walk 1/4 mile daily	Leisurely pace 5 minutes
Week 4	walk 1/4 mile twice daily	Leisurely pace 5 minutes each time
Weeks 5 - 6	walk 1/2 mile daily	Leisurely pace 10 minutes
Weeks 7 - 8	walk 3/4 mile daily	Leisurely pace 15 minutes
Week 9	walk 1 mile daily	Leisurely pace 20 minutes
Week 10	walk 1 1/2 miles daily	Leisurely pace 30 minutes
Week 11	walk 2 miles daily	Leisurely pace 40 minutes
Week 12	walk 2 miles daily	Moderate pace 30 minutes
Weeks 13 - 14	walk 3 miles daily	Leisurely pace 60 minutes
Week 15	walk 4 miles daily	Leisurely pace 80 minutes
Week 16	walk 4 miles daily	Leisurely pace of 72 minutes
Week 17, 18 - 19	walk 4 miles daily	Moderate pace 60 minutes (15 minute mile distance)
Week 20 Continue Indefinitely	walk 4 miles daily	Walk this in 56 minutes (14 minute mile pace, just below a slow jog)

\* Adapted from John L. Boyer, M.D., San Diego, California

\*\* Check your pulse rate immediately at the end of every walk,  
 Do not advance to the next stage (as from week 3 to week 4) unless the immediate  
 post-exercise rate is less than \_\_\_\_\_ beats per minute.

IN PATIENT ACTIVITY PROTOCOL

<u>STEP</u>	<u>DAY</u>	<u>ACTIVITY</u>	<u>EXERCISE</u>
V	10-11 (I)	UP AD LIB ROOM (I) (S)	ACTIVE ROM 9X D-10; 10X D-11
	5 (S)	WALK IN HALL X1 - 1/2 L. D-10; 1 L. D-11 (I) 1 L PRN (S)	ADD: STD EX ARM & SHOULDER; LATERAL BEND; KNEE RAISE 5X (I) ACTIVE ROM 5X - DO ALL EX SITTING (S)
VI	12 (I)	TUB/SHOWER (I) (S)	SAME AS ABOVE. ADD: SITTING EX-
	6 (S)	WALK HALL 1X (I) 2X PRN (S)	TOE TOUCH 5X; TRUNK TWIST 5X (I) ACTIVE ROM 5X - UPPER EXT. EX
		CLIMB STAIRS (I)	STD (S)
		EXERCISE TEST (I) (S)	I=Infarction S=Surgery

IN PATIENT ACTIVITY PROTOCOL

<u>STEP</u>	<u>DAY</u>	<u>ACTIVITY</u>	<u>EXERCISE</u>
VII	13 (I)	UP AD LIB (I) (S)	HOME EXERCISE INSTRUCTION (I) (S)
	7 (S)		

(I) = infarction (S) = surgery

IN PATIENT ACTIVITY PROTOCOL

<u>STEP</u>	<u>DAY</u>	<u>ACTIVITY</u>	<u>EXERCISE</u>
I	2 (I)	B/S COMMODE, SELF GROOMING (I)	ACTIVE ASSISTIVE ROM 5 X (I) (S)
	1 (S)	SIT ON SIDE OF BED (S)	DIAPHRAGMATIC BREATHING 5 X (S) ANKLE DORSI-FLEXION 10 X (S)
II	3-4 (I)	CHAIR 20" TID (I) (S)	ACTIVE ROM 5 X (I)
	2 (S)		SAME AS STEP I (S)

(I) = infarction      (S) = surgery

IN PATIENT ACTIVITY PROTOCOL

<u>STEP</u>	<u>DAY</u>	<u>ACTIVITY</u>	<u>EXERCISE</u>
III	5-7 (I)	BATHE SELF (I) WITH ASSISTANCE (S)	ACTIVE ROM 7X (I) 5X (S)
	3 (S)	CHAIR 30" QID (I) (S)	
		WALK TO BR (I)	
		WALK IN ROOM (S)	
IV	8-9 (I)	WALK IN ROOM QID (2X D-8; 4X D-9)	ACTIVE ROM (SITTING POSITION FOR ARM EX)
	4 (S)	CHAIR 45" QID	8X (I) 5X (S)
		STAND AT SINK TO SHAVE (I)	(CODE -I=Infarction S=Surgery)
		WALK HALL X 1; CHAIR AD LIB (S)	

DEPARTMENT OF CARDIAC REHABILITATION  
PHYSICAL THERAPY IN-PATIENT EXERCISES  
CARDIAC SURGERY EXERCISE PROGRAM

Date of Surgery \_\_\_\_\_

STEP	DAY POST SURG.	DATE	EXERCISE	BP, PULSE	EDUCATION	REMARKS
I			Preoperative visit: Introduction to program P.T. Instruction: Diaphragmatic breathing Deep coughing Splinting techniques Posture Active ankle dorsi-flexion	<u>Baseline:</u>		
SURGERY						
II			Diaphragmatic breathing Active assist ROM (5x) Ankle dorsi-flexion (10x) q.d.	<u>Before Exercise:</u> <u>After Exercise:</u>		
III			Active ROM (5x) q.d. Walk in room.	<u>Before Exercise:</u> <u>After Exercise:</u> <u>Before amb:</u> <u>After amb:</u>		
IV			Active ROM (5x) q.d. Do upper extremity exercises sitting Walk in hall 100'	<u>Before Exercise:</u> <u>After Exercise:</u> <u>Before amb:</u> <u>After amb:</u>		

STEP	DAY POST SURG.	DATE	EXERCISE	BP, PULSE	EDUCATION	REMARKS
V			Active exercise (5x). Do all exercises sitting. Walk hall 200'.	<u>Before ex:</u> <u>After ex:</u>  <u>Before amb:</u> <u>After amb:</u>		
VI			Same as V. Add: Upper extremity exercises standing. Walk in hall 300'.	<u>Before ex:</u> <u>After ex:</u>  <u>Before amb:</u> <u>After amb:</u>		
VII			Same as VI. Add: Home exercise instruction. Walk in hall 400'. (stair climbing optional)	<u>Before ex:</u> <u>After ex:</u>  <u>Before amb:</u> <u>After amb:</u>		
VIII			Same as VII. Walk 400-500' in hall.	<u>Before ex:</u> <u>After ex:</u>  <u>Before amb:</u> <u>After amb:</u>		

\* 100' equals  $\frac{1}{2}$  the length of the tower hall.

DEPARTMENT OF CARDIAC REHABILITATION  
PHYSICAL THERAPY IN-PATIENT EXERCISES  
MYOCARDIAL INFARCTION EXERCISE PROGRAM

Date of Infarction \_\_\_\_\_

STEP	DAY POST MI	DATE	EXERCISE	BP., PULSE	EDUCATION	REMARKS
I			Active assistive exercise to all extremities performed supine (5x) q.d.	Before ex: After ex:		
II			Active ROM (5x) q.d.	Before ex: After ex:		
III			Same as II	Before ex: After ex:		
IV			Active ROM (6x) q.d.	Before ex: After ex:		
V			Active ROM (7x) q.d.	Before ex: After ex:		
VI			Active ROM (7x) q.d.	Before ex: After ex:		
VII			Active ROM (8x) q.d. Do leg exercise supine, arm exercise sitting. Ambulate in room 20-30'.	Before <u>E</u> Mid <u>X</u> After <u>A</u> <u>M</u> <u>B</u>		

STEP	DAY POST MI	DATE	EXERCISE	BP, PULSE	EDUCATION	REMARKS
VIII			Same as VII. Do exercises 9x. Walk in hall 100'.	Before <u>E</u> <u>X</u> <u>A</u> <u>M</u> <u>B</u> Mid After		
IX			Same as VII. Do exercises (10x) q.d. Walk in hall 200'	Before <u>E</u> <u>X</u> <u>A</u> <u>M</u> <u>B</u> Mid After		
X			Same as IX q.d. Walk in hall 300'	Before <u>E</u> <u>X</u> <u>A</u> <u>M</u> <u>B</u> Mid After		
XI			Same as X. Add: Standing: a) arm and shoulder (5x) b) lateral bend (5x) c) knee raise (5x) q.d. Walk in hall 400'	Before <u>E</u> <u>X</u> <u>A</u> <u>M</u> <u>B</u> Mid After		
XII			Same as XI. Add: a) Sitting-toe touch b) Sitting-trunk twist (5x) q.d. Add: $\frac{1}{2}$ flight stairs walk 400'	Before <u>E</u> <u>X</u> <u>A</u> <u>M</u> <u>B</u> Mid After		
XIII			Same as XII. In home exercise program. Walk 400'	Before <u>E</u> <u>X</u> <u>A</u> <u>M</u> <u>B</u> Mid After		
XIV			Same as XII. Walk 400-500'	Before <u>E</u> <u>X</u> <u>A</u> <u>M</u> <u>B</u> Mid After		

100' equals  $\frac{1}{2}$  the length of the tower hall.

## FREE STANDING CENTERS

L. Loring Brock, M.D.

The Free Standing Center, I'll just call FSC, is one that is unassociated, (or at least very loosely) with any hospital, university, or other large institution. It receives referrals or is otherwise utilized by a heterogeneous group of consumers. The medical principles under which prevention and rehabilitation programs are developed are common to all three settings that this particular group is speaking to, and Dr. Fletcher very nicely spoke to several of the scientific principles. Obviously, refinement of detail is evolutionary and highly desirable, but this particular form, is more directed to logistics, motivation of consumers, economics, inter-professional turf and relationships. It is refreshing to see scientists condescend to discuss these kinds of issues (which are so tender sometimes) in an interdisciplinary way. Perhaps condescension will give way to enthusiasm as we grow in maturity and trust. The Free Standing Center that I will speak of is the Heart Lung Center. That is the only one I know much about. I neither claim nor accept responsibility for this particular program since you all have shared your experiences and your concepts with me over a long period of time. Basically, my mission in this whole process is to try to weave a fabric of health care delivery. I bring a description of this program here for your counsel and for your peer review. Where each of us comes from determines basically the type of program we put together. I have been part of the Heart Association's evolution of this program started in a practice in Denver in 1956. Colorado Heart asked me at that time to develop a work evaluation unit. Three or four years later American Heart asked me to begin to participate with their rehabilitation programs. Then in 1969 things began to gather to the point where cardiac reconditioning could become a reality, and Colorado Heart then supported a five year program with Spalding Rehabilitation Center. It could not continue the program without the financial subsidy. So the Heart Association and I, having been at it a good while, decided to continue it at a Free Standing Center which we called the Heart Lung Center. It no longer is supported by the Heart Association, and is strictly on a fee-for-service basis now with no subsidies. One of the characteristics of the Heart Lung Center and the Free Standing Center is their neutrality. Unless the whole community can find some way to use a neutral setting, this type of program is not one that can be kept at this particular level of overhead. It also is an intermediary; it stands between the hospital, the sickness setting, the recreational facilities and the wellness or fitness traditions of a community. That doesn't mean the traditions don't change or the edges aren't blurred - they are. But I think this is where a free standing center does posture itself in the link of health care delivery in a community.

How does it function? The program that we work with is a full time dedication. The word dedication is one that is not particularly attractive to us, because it means you make a commitment which you can't back out of easily. That is where we are. We have made that kind of commitment to our effort. We believe in it. We struggle with it, and we expect to see it succeed. But it does not allow us to keep one foot in the retreat avenue. We built our facility, staffed it, put the instruments and the program design based on these particular goals - obvious optimum recovery, the problems, loss of function, loss of competence and objectives which we felt were important to accomplish. We do not take exercise out of context - either in prevention or rehabilitation. We feel, in a sense, that it can be the tail that wags the dog. We want to take a look at the individual and all his needs and not make the assumption that exercise is sufficient unto all. Exercise is

important in overcoming these, but so are other areas, and this is where I feel that, in order to achieve the optimum recovery, these objectives need to be approached, and hopefully, with success.

Education (Ms. Berra spoke to that) is extremely important but not always effective in and of itself. Secondary prevention - we know there are some soft spots in that, but whether this is art or science doesn't mean much to me. I will leave the definition of why things work up to the people who study mechanisms. If they work, and if they help people, then I am satisfied to deliver that and wait for the reason. The social, vocational and economic resettlement - this oftentimes leads to the most important thing to the individual. They have survived an attack, but don't want another one. They suddenly get caught with all their responsibility and become panicky and they need some help within the family, within the community, within their work and oftentimes within their economics. And so, exercise is a pivotal part to all this, but it is not sufficient unto itself.

In looking at the prevention program, obviously a program working on the economic basis we do has to provide programs that the community wants. We are looking at areas of prevention today and the areas of health. We may have started out in the area of the prevention of heart disease, but we feel the community says that's insufficient. I'm not just interested in my heart. I'm interested in alcoholism; I'm interested in prevention in other ways, so if you take the traditional physical as it is delivered in the doctor's office, basically this is pretty much what you get. And the answer is "yes, you do have disease", "no, you don't have disease, we'll see you in another year or two or three". In a physician's office you should identify those individuals who are vulnerable to premature disease by identifying risk factors or other health hazards. This is the diagnostic or evaluation process. But this too is not sufficient - unless you can do something here you might as well forget this, for this only leaves them with anxiety. Just giving advice and reams of bibliography does not make this happen. We have to be able to help the person, and what we do, if we have the statistics, such as the Framingham data which came out in the black book the Heart Association put together, we tell them what happens to people with their profile. We don't say they're going to get it, but the risks are greatly different between those in the "upper left hand corner" and those in the "lower right hand corner". Since life is basically a group of probabilities anyway, they understand. Now we are in a position where we have to say "all right, here is what we feel you should do, here is how we think you can do; go home, come back in six weeks and let's see what kind of shape your act is in". Those things they can accomplish on their own is the best experience because they can stick with it. Oft times they don't.

On the other hand, if they can't give up the smoking or can't get their exercise program started, they have to have some help. This has to go to the market place. We know it's not enough for a person to make a decision that he is going to do something about it or even get help. We have to look at the environment in which he exists, and we have to work with people who control (to some extent) those environments, i.e., schools and businesses. We have to take a look at prevention and all its ramifications in the community. Over here is the other end of the evaluation; this is looking up stream; this is preventive medicine; and this is looking currently at how a person performs today. Business is interested in this as well as individuals. Physical fitness, mental and emotional fitness - obviously we don't have all of the method of doing these things, but you have to start with a concept; you have to use what you have; and you have to develop what you need. This is where we stay close to the scientific community, to the department of

preventive medicine at the medical school, and we expect them to validate and invalidate what we are doing. This is how we are operating as a delivery system.

In a Free Standing Center, what are the advantages and opportunities for growth? In some ways opportunities for growth are quite good; we have motivation. In other words, our overhead is dependent upon our performance and satisfied people. We do not have things that we can ride out for a year or two, and that is motivational, I guarantee you. By the same token, somehow or other, we are not good businessmen and, therefore, take economically unsound risks. Sometimes we get burned on that. If you wait until you're sure of something, oft times you won't ever do it. These kinds of things do help us look into the whole health program and how it can be offered to a community. A program that is away from the hospital tends to identify with health, wellness, well people, well situations and fun, and not hearing the sirens every day and saying "there but for the grace of God come I." In a Free Standing Center you can identify with the sickness system and the wellness system. You can reach out on both sides. You can reach upstream into the hospitals and help them in starting hospital programs. You can reach downstream into the athletic facilities. We have a sports medicine facility with an orthopedic group within this institution, and the orthopedic people are extremely busy now. They have a physical therapist there working everyday and almost full time. That is basically in the area of stress testing.

We are also into those kinds of settings, and they are close to our consumers in the modification programs. There are a lot of things a Free Standing Center is free to do not being constrained by boards and administrations, etc. Are Free Standing Centers viable? That is an interesting problem, depends on maintaining quality. There is no such thing as tenure, union support or opportunity for complacency. The commitment is to the community and not to one hospital. We have peer review at home as well as here. The Colorado Society of Cardiovascular Medicine provides peer review for us as well as for other programs in the hospital setting. Concerning being associated with the administrator of a hospital for the insurers to be comfortable, is something there is a way around. Whether or not we will survive in this kind of a setting depends somewhat on cultural changes and funding. If the culture stays the way it is and if big is beautiful, which, I think, consumers don't entirely agree, then the Free Standing Center will have a continued problem, and labors of love are for lovers, not businessmen. Love is a spiritual parameter and basically so is its fruit. Solvency is a worldly parameter and so is its return. Ultimately it does become a value judgment and a choice for both the individual and the culture, whether he is going to get into this kind of a thing. As for us, we couldn't be happier and have less. Thank you very much.

## COMMUNITY FACILITY

Donald G. Pansegrouw, M.D.

The Dallas Cardiac Institute is a nonprofit cardiac rehabilitation program that was begun in 1973 in Dallas after the idea was formulated. Someone came along with a small amount of money and we began. It was set up on the basis that it was a referral-only cardiac rehabilitation program. To gain the approval of the local cardiologists we incorporated most cardiologists in the Dallas area into the board of trustees and into the consultants of the institute. We made great effort not to align ourselves with any one hospital or physician group although perhaps the hospital I work at had more influence in the program. Efforts were made to counteract any such tendency. To avoid duplication of efforts we avoided doing stress testing within the Institute itself and if there was an inadequacy of the stress test, we tried to improve the quality of the test in that facility even to the point of occasionally doing tests over at no charge.

Emphasis was strongly in the direction of the Dallas County Cardiac Institute physicians not to take over or destroy a doctor-patient relationship but to enhance that relationship if at all possible. When the patient is at the rehabilitation session, the physician there is totally in charge in terms of the exercise prescription, whether or not the patient's arrhythmia or angina is felt to be adequately controlled, to permit safety of the exercise session. In the case of any emergency treatment that might be required, the physician was totally in control until the patient arrived at some hospital designate when he entered the program. By so doing, we were able to achieve referrals although the program started extremely slowly and deficits were extremely high in the first couple of years. Initially, we staffed all programs with a physician, exercise physiologist, technician or nurse. We chose physicians in private practice for staffing. They were not remunerated for their services because that is where all the deficits went. The physician failed to get paid. But it was a good opportunity for the starting cardiologist in a metropolitan area such as this to become known and subsequently we incorporated the fellows from Southwestern Medical School who otherwise would have no experience in rehabilitation. It was good training for them and we remunerated them and they appreciated that from both standpoints.

We have subsequently added a lecture series which is carried out once a month to the overall program. One of the most successful aspects of this has been the low cholesterol prudent type diet which is a "pot luck" affair and everyone brings in some dish and then a lecture is given, either on exercise or smoking or a CPR seminar is given and it provides both an educational and social event that has been very well attended. We have 100 to 200 people attending such a session. The dietitian reviews the recipes that have been brought in and then they are printed and circulated to the members for their own use provided they do fall into the context of a prudent diet.

To further lessen costs we used existing facilities rather than building a facility dedicated to such a purpose. Building of a facility for the specific purpose of cardiac rehabilitation would have to incorporate a large amount of testing and other type of procedures and/or incorporate a large number of healthy people to subsidize the cost of the cardiac patients, at least on the basis of charges that we have instituted. We found several facilities in the metroplex that were well suited. The first one we utilized was the Town North YMCA

which had a large double basketball court gymnasium and a pool that was adjacent (but not readily accessible). After some fund raising and improvements some years after the program began and the addition of an outdoor track, it now has an adult fitness center. The gymnasium is unchanged but the pool is closely adjacent and immediately between the doorway. Between the pool and the gymnasium is a quarter mile outdoor track. The consistent times most of our patients are working out has been the early morning hours. Most of the programs start at 6:30 in the morning and there is a continued push on the part of patients and an opposition on the part of the staff to begin earlier. I'm certain that if one moved to five o'clock in the morning there would be someone there earlier.

We have been able to rent from gyms on an individual basis. We use the SMU gymnasium, and the gymnasium at a community college in Irving, (North Lake). They are usually very, very nice facilities. When a patient first enters the program he is interviewed by a physician. The patient's history is reviewed. We've made the referral a much simpler process. Initially, we sent out forms that were usually not completely filled out and often lost. The logistics of getting a patient into the program has been simplified so the patient simply comes, with whatever information the doctor may have given him, to one of the sessions in the morning, is greeted by the technician or the doctor and the subsequent information is requested. The patient is then advised as to what he is to do and what not to do and advised regarding the warm up (which we consider extremely important) and the cool down and is given an individualized exercise prescription which may be changed on a daily basis at first or weekly or monthly as the situation may dictate. They are given a monthly sheet on which they record the amount they are walking, jogging or swimming and their heart rates and blood pressure and so forth. At each session the blood pressure in the hypertensive patients and, less frequently, in the patients who have stable blood pressures, is monitored.

Rather than using telemetry (because of the expense of the units but also the expense of electrodes and hooking the patient up each session, someone to watch it, and the difficulties that are encountered) we have used a tripolar electrocardiogram which is simply a three lead applied to the chest and rotated and magnify the P wave and brought it out in the various axis that the P wave may deviate. We can recognize a moderate amount of ST segment changes. Occasionally, we will recognize ST changes which seem adverse to us that are not recognized on the treadmill test but the converse also occurs because of the different lead system. We are able to recognize arrhythmias fairly well and we initially had the usual emergencies of ventricular fibrillation and so forth but are now in excess of some 40,000 patient hours without an episode of severe arrhythmia or ventricular fibrillation and I believe that is because of the fact that we monitor closely. If a patient has any arrhythmias he will be checked multiple times during the session. The spot monitoring is a successful and rather economical approach. The centers are pretty much equipped as a CCU would be with a back up defibrillator system. We have two defibrillators at each unit. One is battery powered and one is wall powered. We have multiple EKG machines depending on the size of the program. We may be monitoring several patients at a time at the Town North but only have one EKG machine at the Irving program (which is the newest program). We do not have pacing capability at the units but we use nasal gastric suction and endotracheal intubation, etc.

We do allow some patients to start early that have been in the program; have been stable; have risks that are considerably below the average of ventricular fibrillation; and other catastrophic things. We allow these patients to start before the physician arrives. The technicians and the patients arrive about fifteen to twenty minutes before the physician

and there is a warm up period. We do allow early starts and the indirect supervision occurs at this time but way of a radio EKG which would go to the Parkland emergency room in the event there was an emergency. Thus far there has not been one. The dietitian comes to the sessions about once a week in the early morning hours so that they can get additional dietary advice and motivation. The funding for this program began as a charitable donation and it is on a tax exempt basis so donations can be made. The charges were determined on a break-even basis. With the growth of the program, the Town North program now is creating some income. The other programs are losing and so we are almost on a break-even basis. As we approach break-even basis we will probably start another program and that's the way its been organized and set up. About 80% of the income comes from patient fees and about 20% comes from donations. We have had some formal fund raising. The first one was about two to three years into the program and was quite a bit of work and involved a lot of organization. The second one was conducted by the members of the program and they are more expert at that than we are and they did it very quickly and raised more money. About 10% to 15% of the patients are considered to be hardship and they are not billed at all or pay whatever they can. We have had no success whatsoever with Medicare. It seems that if we had incorporated the word clinic into our name and had called ourselves the Dallas Cardiac Clinic instead of the Dallas Institute they would have paid. (I realized that the phone bills were exceeding the revenues from Medicare and I quit calling.) Acceptance of patients is by physician referral only. Post myocardial infarction patients are accepted about one week after discharge although if the physician desires, we do accept them immediately after discharge.

The average patient comes in one or two weeks after discharge. We like post bypass patients to spend a week at home getting over their soreness before they begin and usually start them walking a mile at the first session, maybe two. A lot of the patients have angina and abnormal stress tests and we do have some special categories that we will take. Once in a while we get a referral from a psychiatrist for a patient who is depressed. We have one paraplegic patient who swims. We decided that we probably had the safest place for him to swim. About half the patients had angina pectoris; and half were post myocardial infarction and about 30% were post aorta coronary bypass. These were 1975 numbers and the ratio of angina pectoris has diminished with the more widespread use of the bypass operation. More of the patients are post bypass and probably about the same number are post operative myocardial infarction. It is interesting to note that the number of patients in the program who have had prior cardiac arrests remains around 10%. We now have a battery operated defibrillator in our start-up cart, both wall current operated and an EKG machine, oxygen, section and the necessary medical equipment. Insurance coverage averages around 80%. Some pay more than others and some don't pay at all. We did survey the patients who have been in the program and have had coronary arteriography so we have a pretty good idea of the extent of the disease. We compared the active to the inactive. The inactive being the people who were in the program for only a few weeks and dropped out. We paid special attention to the fact that they didn't drop out for any cardiac reason. We had roughly equivalent age. The number of follow-up years was fairly comparable and the number of patients having coronary arteriograms was slightly greater in the active group and the number of coronary vessels that were occluded greater than 75% was slightly higher. None of these numbers was statistically significant but simply a comparison. The national average based on age and sex and our active patients was 8.65 per thousand and our inactive patients had a cardiac death rate of 18.98 which would suggest that we are certainly doing no harm. We have had three aspects of the program. One was first to provide a service and the second was to educate both on a peer level as

well as on a patient level and the third has been towards research. We are just getting ready to get into that area. We have cooperated with the medical school in some aspects and in some studies and we have encouraged that sort of thing. In general the program has been rewarding. It could be copied and started in most areas. The initial money to start a program is about \$20,000. Thank you.

QUESTION 1: Could you elaborate a little about the spot monitoring you talked about.

We use a little Japanese-made electrocardiogram that weighs about eight pounds and is about the size of a cigar box. This unit is either wall current operated or battery operated and takes about 30 seconds to convert it from one to another. The battery drain is quite high so you have only a short period of time with the flashlight batteries. They also have a tripolar electrocardiogram which has three electrodes equally spaced. The thing is placed on the chest. This particular electrode is the exploring electrode, a kind of combination between lead 2 and B5 and comes fairly close to the CM5 lead and by rotating this, one can change the configuration of QRS. Women can have their bra on and we can simply turn it upside down, put the exploring electrode up in the same place and we get less amplitude but basically the same EKG. So it has worked fairly well.

QUESTION 2: You can only use that for short intervals?

DR. PANSEGRAU:

Six to eight seconds and it will be done at least once or twice on every patient per session and a lot of patients will get it five or ten times if something doesn't seem quite right. It is very easy to recognize anteroseptal infarcts with it, right bundle and left bundle branch block and arrhythmias and so forth.

PATIENTS IN EXERCISE TESTING AND TRAINING

Post MI Patients	Richard A. Carleton, M.D.
Post Coronary Bypass Graft	Henry S. Miller, Jr., M.D.
Patient Psychology	Thomas P. Hackett, M.D.

## PATIENTS IN EXERCISE TESTING AND TRAINING

### Post MI Patients

Richard A. Carleton, M.D.

In this discussion I will focus on the patients who have had a myocardial infarction. Yet as you are all aware, the kinds of programs that we are involved in are not aimed exclusively at that category of patient.

I'd like to give just a bit of historical perspective to the kind of approach that we've taken. Speaking specifically of the myocardial infarction patient, Sam Fox mentioned the Mallory-Weiss-Parker paper of 1939. The knowledge of infarct pathology more or less set the standards of practice for the next decade or so. When I came on the medical scene in the mid 1950's, we had already moved rather dramatically from the mid 1940's practice of putting people with diagnosed myocardial infarction to bed for roughly the twelve weeks anticipated to be required for the completed scarring process. By the mid 50's that had decreased to approximately six weeks. By the early 1960's the time in bed had fallen to about two and a half to three weeks. By the late 1960's, in turn, it has fallen to approximately a week in bed. It was during the 60's that people were, with some temerity, permitting patients into chairs following the leadership of Dr. Sam Levine. The trend continued, and by the early 70's people were more courageous and were moving patients around even more quickly. At the present time, we are scarcely letting them contact the bed at all except at night. As we attempt to project into the future, perhaps we are already seeing some of the portents in studies conducted in Israel and England. Some of these patients may not even need to be hospitalized. In essence, there has been a dramatic and progressively greater degree of early rehabilitation in the early stages of management of the patient with the myocardial infarct. We have followed this trend in a sense and have adopted a rehabilitation protocol accordingly. When we established our program, we looked at patients with myocardial infarction and decided we had several needs that we'd like to meet. One had to do with the recognition that individuals who have recently experienced myocardial infarction are commonly individuals in despair in terms of their own outlook. At that point in time the health belief model of Rosenstock and Becker was powerful as a motivational tool. We felt that we could capitalize on this very high degree of motivation. At the same time we felt that we wanted to minimize any deconditioning process that might occur either in the hospital or out of hospital. As a consequence, we constructed a program which makes an effort to provide a continuum of care, starting in the coronary care unit for the acute myocardial infarction patient. Also, we are dealing with many other kinds of patients - patients with old myocardial infarction, angina, pectoris, coronary bypass, a variety of people. Therefore, we attempted to construct a continuum of care between the coronary care unit, the hospital stay, and a community based program.

Our program begins in the coronary care unit. We bypass passive exercises and begin with active, admittedly very gentle, calisthenics. We feel that from a psychosocial standpoint this early programmatic involvement has substantial benefit to the individual. It does not have any deleterious physical consequences that we have been able to detect. We continue the program through the hospitalization. Rather than having a hiatus between the hospitalization time and starting a rehabilitation effort, we start the ambulatory

patient phase immediately upon hospital discharge. This helps to overcome the inactivity and depression which commonly follow the traditional physician admonitions - go home, take it easy, don't do too much. If a patient goes home on a Friday, they usually appear in the community facility on Monday. Our medically supervised component is in a community facility but is run by the hospital. This had both the virtues of providing excellent facilities and of placing the program and patients in an atmosphere of health rather than an atmosphere of illness. This picks up the theme that we heard of yesterday from Dr. Erb, the wellness-illness continuum. It provides an opportunity for individuals to function shoulder to shoulder with those who are basically well. A continuum of people can be easily constructed including those who are well, those who are judged to be at risk but are otherwise fundamentally well, and those who are ill or recently ill. We have found this kind of a model has worked well from the standpoint of the myocardial infarction patients. For example, during our educational sessions held in the hospital, it is very advantageous to have those patients in pajamas mingle with those who are three, four, five weeks out into the community and succeeding quite well. It provides a very real psychological boost. Similarly, at the YMCA it is a positive experience for people who are three weeks post MI to exercise - at their own pace - and to see successful role models 3, 6, or 18 months out.

Our program differs in that we begin the post - hospital exercise program immediately upon discharge. It is similar in that we set short and longer range achievable goals; we use three supervised exercise sessions weekly; and, we use standard, individualized exercise prescriptions. The typical gradations are indicated on this slide. Each exercise period is comprised of calisthenics, 5 minutes of warm-up, 20 minutes of training level exercise, and a 5-minute cool down. Each patient is monitored at each new step-up in training exercise intensity. At two weeks post infarct, they function at about 2 METS. The intensity increases in weekly steps to approximately 8 METS or slowly jogging most of the 20 minute training period by the 12th week after infarction. Exercise at home is prescribed twice daily at a level of 85-90% of that used in the monitored program.

We now have had over 10,000 patient hours with this. We do monitor these patients closely. They are rather close to their infarcts. We have had one episode of ventricular tachycardia. We have had no episodes of ventricular fibrillation. Obviously we have had many episodes of angina. Individuals who develop angina during infarct rehabilitation or individuals who enter the program with angina progress at variable and totally individualized levels. Their rate of progression is usually slower. They may require 6 or 8 sessions per exercise step as training improves their functional ability.

Upon reaching the 20 minute jog level, many patients enter the contemporaneous, but non-monitored, program. By contemporaneous I mean that they are functioning in the same gym, at the same time, and under the "eyeball" supervision of the medical personnel; but they still are not "officially" members of the hospital program. They are not billed. The community facility is a YMCA. These patients join the YMCA and exercise under the directorship of the YMCA physical director. We think this creates a good continuum with a good deal of shoulder rubbing opportunity in an atmosphere of health.

From the standpoint of exercise prescriptions, we follow very standard approaches. We fear the Federal bureaucracy. We feel if we continue along the paths we are going; if exercise becomes a recognized therapy; the FDA or some other agency will require package inserts in each box of Nike shoes. If they do, I'm sure they will come up with actions, indications, contraindications, warnings, precautions and dosage and administra-

tion admonitions for this therapeutic modality as with the package inserts in medication packages. Very briefly, the major actions include these on skeletal muscles. There is no question that trained muscles become much more efficient. This is as true in the myocardial infarct patient as in normal people. We do believe that we are able to offset many of the deconditioning effects of the myocardial infarct process by the kind of early rehabilitation efforts that we undertake. We are persuaded there are also major psychic well-being actions. Clearly heart rate changes manifest the autonomic nervous system reset which occurs as a consequence of physical fitness.

In terms of indications for exercise, we don't know about reduction of risk; we hope we are providing secondary preventive care, but that is unproved. There is no question that for the vast majority of these patients you can achieve improved effort tolerance. Equally surely you can restore self-confidence very early on. The change in attitudes which occur as soon as people realize they are part of a structured program, the intent of which is to help them to improve and to recover, is remarkable. Contraindications to exercise are self-evident. They include severe congestive heart failure, complex ventricular arrhythmias, unstable angina pectoris, and muscular-skeletal inability. Patient non-compliance is an occasional problem. With a very individualized program, as distinct from the more uniform group that is feasible if everyone is uniformly distant from a myocardial infarct, a particular form of non-compliance sometimes emerges. This is particularly evident with people with Type A behavior pattern. We have had races develop on the gym floor between people who are three weeks post infarct and people who are twelve weeks post infarct. The cure is simple: turn them in opposite directions around the track.

With reference to muscular and skeletal inability, we use three basic modalities of isotonic aerobic exercise. One is walk/jog. The second is pedal ergometry using the legs, and the third is pedal ergometry using the arms. The latter is used for people with amputations or with vascular insufficiency to the legs. For warnings, we too use heart rate as a work-a-day type of guide; as with all other therapeutic modalities, any dose of exercise in excess of the target may well be harmful. As tolerance develops the dose is increased. Under therapeutic precautions, warm up is very important - especially in the post infarct patient or in patients with coronary disease. It is equally important that exercise be at levels beneath those proved safe. Concerning adverse reactions, a major part is patient education. We, too, use a three minute - three nitroglycerine rule concerning angina. In our educational process, symptoms of ventricular arrhythmia and of hypotension are emphasized. How do you administer this type of therapy? The FDA may want us to acknowledge that this isotonic therapy is administered on hill and dale.

There are many real and some fancied effects of exercise training and physical fitness. Primary prevention is not of concern in the post infarct patient. I am persuaded by epidemiologic evidence that fitness does provide some degree of primary prevention. This preventive effect is less powerful than not smoking or the absence of the other major risk factors. Does exercise reverse atherosclerosis? There clearly is nothing we are presently able to do that will reverse atherosclerosis in man. There is some evidence obtained in studies of femoral arteries by Blaukenhorn and his co-workers that rigorous dietary control may produce some reversal of simple plaques. Does exercise produce coronary collateral in man? Certainly there is no evidence that it does. Is peripheral metabolism altered? Yes! There is no question that skeletal muscle metabolism is changed to make the muscles more efficient aerobic machines. Scheuer's data suggest that there may be some minimal changes in cardiac metabolism, but these seem to have little clinical

significance. In part, these changes may reflect altered autonomic nervous system activity. Cardiac performance, on the other hand, clearly is beneficially altered largely through changes in autonomic "set". Psychologic effects are clear. Self confidence is enhanced. Depression and anxiety are alleviated. We think that the type of early program which we provide gives more rational grounds for making judgments about early return to work. We do counsel return to work as early as four weeks for individuals whose work requirements seem well in keeping with their performance under supervision. We think these early rehabilitative efforts minimize the kind of welfare mentality that sometimes develops in these patients and make productive lives more likely.

We have a mobile cart at the YMCA. It is, in effect, a mobile coronary care unit with four telemetry channels, defibrillator, and all the standard resuscitation equipment. Blood pressure is recorded before and after exercise. Each patient is taught to take his own pulse and thereby to monitor his exercise intensity. We calibrate their ability using the telemetry unit. Our personnel are a physician and a nurse. The patients start with calisthenics. We often work, as illustrated, with spouse pairs. We strongly emphasize family involvement and, particularly, spouse involvement. We have been impressed by the work of Brownell and others in getting spouse involvement to enhance the social support mechanisms. The next slide illustrates a man about two and a half weeks post infarct beginning the slow progression of walking intensity described previously. The next slide illustrates another man who is 11 weeks post infarct during his first effort at jogging a mile.

As I indicated previously, we work in a program which spans the recent infarct person through the well population. We work very closely with the Y personnel in this regard. We have adopted a mechanism whereby we can rather simply slide people from one to another program element. As the ill progress to health, a healthy people program is there for them. When questions arise about the health of those in the YMCA -run program, they can be monitored for a session as a form of real world stress test. We do not believe that every individual needs to be screened by graded exercise test before undertaking physical exercise. We recognize that there are risks. We also recognize, from an epidemiologic standpoint, that the risks are small. From a cost effectiveness standpoint, we feel that the symptomatic state of an individual ascertained by inquiry is the best indicator of suitability for an exercise program. This coupled with careful instruction about heart rate monitoring and potential adverse reactions probably makes the best population-wide sense.

During exercise training sessions we continue the secondary prevention emphasis initiated in the evening classes. We spend a great deal of time dealing with the patient and his family. We make every effort to get the children, the spouse, and all of the members of the household unit involved. We deal with the primary risk factors, nutrition and diet, weight control, blood pressure control, smoking, and stress management. We use a variety of behavior modification approaches: personal commitment, public commitment, some contingency contracting, and a variety of other approaches particularly as it relates to smoking. We also capitalize on the strong motivation of the health belief model paraphrased by: "My God, I had a heart attack!" These people are scared; if you latch onto that motivation early on, you can have a very highly effective smoking cessation approach. We deal with stress management in a very active way must as we attempt to maximize psycho-social support.

As I've indicated, we spend a good deal of time in terms of family education to build a social reinforcement group at home. Vocational education, vocational rehabilitation, and vocational counseling are important elements. We try to make estimates very early on as to the probability that an individual will return to his previous occupation or activity level. For those in whom we feel there is a low likelihood of return, we establish early contact with our state vocational re-training and counseling services. From an educational standpoint, we deal with a wide variety of things. We attempt to be as specific as possible to teach not just theory but also skills. We teach, for example, precisely what is in various kinds of foods. The good American frankfurter, for example, one eighth of a pound, contains about 280 calories; 81% of those calories come from fat, and virtually all is saturated fat. We spend a great deal of time on menu planning, on specific foods, and on the skills of shopping. We deal with this kind of information pointing out exactly what they as consumers should look for in the market place and in recipe books. We illustrate with food product composition labels in an effort to make more intelligent shopping choices. All of the risk factors interact. This point is made to the patients and to their families. We are not positive this type of educational program works, but feel patients want to know what can be done and what they reasonably can do to become part of their own health care system. We actively encourage them to do so. This whole area of secondary prevention and cardiac rehabilitation blend very naturally. Moreover, when you deal with a spectrum from the recently ill to the well, there is a natural continuum of secondary and primary prevention. From the standpoint of modifiable risk factors, we are really talking about lifestyle. Sam Fox quoted Pogo yesterday in a slightly different context. From a standpoint of cardiovascular disease risk, the words "We have met the enemy and he is us" are appropriate.

I will conclude by briefly summarizing. We feel it is appropriate in this day and age to mount a comprehensive rehabilitation and secondary prevention effort for patients with coronary disease. We feel it is equally appropriate to have that programmatically merge into a primary prevention effort extending into the entire community. Rehabilitation efforts are best delivered as a continuum starting very early in the progress of post infarct patients. In this way you can avoid many of the physical and psychological deleterious effects that occur to the post infarct population. Thank you very much.

## PATIENTS IN EXERCISE TESTING AND TRAINING

### Post Coronary Bypass Graft

Henry S. Miller, Jr., M.D.

With the last talk everything I had to say now has been said. As we anticipated, there would be repetition, but we would learn from each other. The programs in which Dick Carleton and I work are quite similar. I knew very little of his program before arriving in Dallas.

We are getting more and more patients that have had coronary artery bypass surgery, and I would like to discuss a few things I think are important considerations in this group. First, many have had previous or intraoperative infarctions and have experienced or need the rehabilitation techniques that Dick described. However, in our program most post-operative bypass patients have never been in a rehabilitation program, neither Phase I or Phase II, nor practiced preventive methods from the time of their infarction or from the time they developed their angina to the time they had the studies leading to the bypass operation. Now approximately 50% of our operative patients have had infarctions at least to varying degrees of severity by the time they have had their bypass, and only 15% have been exposed to any type of preventive or rehabilitative program.

The surgeons have given us an excellent method to care for the pain that is created by myocardial insufficiency due to coronary obstructive problems. We now have the opportunity of getting many patients back to work relatively pain free far earlier than we were able to by various drug manipulations for angina control. The techniques of removing ventricular aneurysms or large akinetic segments to allow the heart to pump more effectively is another method of improving patients to a working state. As with the infarction and angina patient, getting them ambulatory early and back to work before they become a member of the "disabled society" markedly improves the overall patient productivity. They start having angina or other symptoms, are studied, operated and recover and are back to work rather rapidly.

There are many ways to accomplish the rehabilitation of the post-operative patient, but I would like to talk about ours and one established by Mike Pollock at Mt. Sinai Hospital in Milwaukee, Wisconsin. His patient population is usually about five bypass patients to each myocardial infarction patient entering the program.

Information for the patients to read and discuss is very important. When they are in the hospital for studies prior to planned surgery or on admission prior to surgery, they should have this information. Included should be all patient and family education material and the importance of their control. Instruction in the types of exercise you want them to do post-operatively prior to the time they are operated on is extremely vital. They are more receptive and are not in pain or sedated. This has been the way we have gotten our patients up and moving and reduced the chest motion limitation; improved the breathing post-operatively; and improved ability to cope with leg incisions.

Specific points should be discussed with the patients. First, there is a real need for good explanation of the information gained from the diagnostic test if it hasn't been

accomplished when the tests were done. Second, it is equally important to discuss the surgery, how they are going to feel immediately post operatively and during the first couple of months, and the residual they are going to have in terms of symptoms on a long-term basis. Third, reasons for and a description of the immediate and followup rehabilitative and preventive program that you plan for this person post-operatively should be outlined and the fact that it starts immediately after surgery.

We have a little booklet that demonstrates some of the methods. Everyone has a different logo to represent the heart. Our peanut has a scar that has healed well. We have a teaching format for patients entering the hospital for surgery. We apply a variation of this for our patients who have infarcted. We start with the surgical patients prior to the time they are operated on, during the days they are getting their preliminary evaluation.

The risk factors are described individually in nicely written lay language, an explanation of why each is important and how one can hopefully control them. What is coronary bypass surgery? They have seen a lot of pictures or slides, but having something in their hand to discuss with the family and talk about later has been very valuable. The patients know exactly what they are going to have done.

It is important to start the exercises soon after surgery. Our physiotherapists do this in the Intensive Care Unit on about their second day, combining deep breathing with upper extremity activities. The leg exercises with which you are familiar are also used. This progresses to walking them around; walking with them to the bathroom; walking with them in the hall while monitoring their heart rate. Our patients are always on telemetry monitoring systems in our post intensive care units, and EKG strips can be run while they are moving around, i.e., taking a bath, walking the hall, performing in the bathroom, etc.

They are monitored during these times by the nurse or attendant at the monitoring station who is informed when the patients are going to be doing these activities. This has allowed us to treat arrhythmias before they get complicated. At Mt. Sinai, Mike Pollock has bicycle and treadmill exercisers and the ability to monitor 6-8 patients. The patients come to the area and exercise under the supervision of a coronary care nurse and physiotherapist. They do this for 20-30 minutes twice a day as he tries to prepare them to return back home. Their patients, like ours, are primarily from out of town, so he likes to do the best job possible getting them oriented toward being well patients before they go home because many cannot come back to his or any outpatient program. This is some of the basic information about what we do. Dietary information, anti-smoking programs and the behavioral modification are included in the patient information and instruction.

There are many ways to present information to patients. The most complex TV station I have ever seen within a hospital was in Germany. The patients could have played for them at a certain time of day, on request, any educational program on their own personal television in their room. Our system is not nearly so sophisticated. Primarily, we use the materials that we watched in the other rooms yesterday, the Heart Association slide tape presentation "An Active Partnership for the Health of Your Heart." They are very good teaching aides and are available. In addition to the daily physical activity, patients have a daily session with some person talking to them about some aspect of risk factor control, the disease, etc., as they go through their days in the hospital following surgery. The post-operative stay has been shortened to such a degree that we hardly have time to "feed" them all the information we would like them to have.

Hospital discharge instructions and information to explain the potential problems are equally important. Talking to them about their medications in detail including the side effects goes without saying. Dietary description to patient and spouse before going home includes a reduction in calories, fats, and excessive refined sugars such as in baked desserts. Their home exercise program is outlined. The symptoms and signs and what to expect are outlined in the books. The Mt. Sinai staff did an excellent job illustrating the problems such as leg swelling, temperature increase, and when the physician should be called. We have found if they have information to which to refer, it eliminates many phone calls and trips to the office and hospital by the patients taking care of problems at home.

Without a Phase II program and a delay of 4-6 weeks entering our community program, we have had to rely on a lot of in-house information that can be taken home. Most patients are seen in the office at least two times for discussion of symptoms and activities between the time they leave the hospital and the time we see them in the community rehabilitation program to assess them. Many have a very low functional capacity for several reasons, such as having a poor ventricular function and prolonged disability before surgery. We have elected to take all patients regardless of functional capacity and have been reasonably successful in improving them to a comfortable capacity. The low-functional patients range from 2.8 to 4.9 METS when first evaluated and improve to where they are functionally able to perform their household duties, their bathroom activities, sexual relations, and other activities without the angina or dyspnea from which they were limited. It is important to treat everybody the same. As mentioned, they are usually about a month out of surgery at the time they enter the community program and need functional laboratory, dietary, psychological and vocational assessment.

The laboratory assessment is nothing new. We use a 12 lead EKG and blood pressure monitoring to precisely decide what their exercise prescription should be at the time they start. We can also assess the arrhythmias and the point of onset of symptoms and ST segment change by using a low level, one MET increase/2 minutes protocol to obtain the best and most precise end point. We are not doing diagnostic tests on these people but are primarily doing functional evaluations.

The next few slides show basically what we do in exercise therapy. We are fortunate to have a nice large swimming pool adjacent to our testing lab and within 50 feet of one of the gymnasiums. So, we use this for our patients with walking disabilities and those who prefer swimming. They swim with a ski belt which makes them more secure at the beginning. Most cannot exercise at a 60% functional capacity in the gym or pool. We have them gradually increase over 1-2 months to 60% as showed by Dr. Carleton. Basically, we try to get the patients to exercise at a level necessary to produce the prescription heart rate.

Many methods of monitoring heart rate during exercise are available. Telemetry monitoring on land and in the water is best demonstrated in the German Rehabilitation Hospital. They had an excellent sealed unit to use in the water monitored by a central tape recorder. We monitor heart rate by using the "quick-look" paddles of the defibrillator. This is a 15 second strip to check heart rate and arrhythmias and confirm the pulse rate the patient takes and records. They do this three times during their exercise period, starting with five minutes into the exercise session. Warm-up exercises are primarily stretching exercise for stiff backs and joints. We combine upper extremity and chest wall exercises to help the chest wall soreness. All patients do it whether they

have been operated on or not. After the stretching exercises, the patients continue to warm up by walking slowly, 2-3 laps, before increasing the walk-jog to elevate the heart rate in the training range while they continue for 25 minutes. Ours is not nearly as regimented as the technique we saw in New Jersey. We can't get Southerners to fall in line for anything. I think, like Dick explained, having the beginning patients in with others who are more active in a situation where you can control the competition is extremely valuable. They realize that the guy that infarcted eight weeks ago and this lady who had a bypass two months ago are now jogging and enjoying it. It gives them a lot of stimulus to improve. A lot of aggression is dispatched playing volleyball. The style of play depends on how long they have been in the program. The starter lets the ball bounce one time on each side, and three people have to hit the ball before it is passed back over the net. A more conventional game is played by the more advanced patients. They like this type of aggressive sport; it fits their personalities.

In spite of Herculean effort, we have found out in reassessing patients that our education in the hospital is poorly retained after about six weeks or two months. It's unbelievable, particularly from a dietary standpoint. It's as has been said, when a person is acutely ill or hurting, they do not retain a whole lot of information. In dietary therapy and counseling, we use a questionnaire, take a diet history, have the patient keep a 7-day diary and a 2-3 day recall later. Then we combine that with the serum lipid results, percent body fat analysis, height, weight, etc., and the diet, as has been previously prescribed, and try to put together a diet. The nutritionist talks with both the patient and then the patient and spouse together concerning food preparation, meal planning, how to read a label, what is really in a hot dog and discusses foods that people commonly use as their lunches, caloric reduction stressed the most.

The psychological assessment of the patient should be started in the hospital and include family counseling. We use a questionnaire and a series of tests on admission to the program. Our present psychologist uses his own modification of the MMPI, a test for depression, anxiety and others. In addition, they have a 30-45 minute interview with each patient after they have evaluated the test. We attempt to do all the testing during the first week and a half the patient is in the program. After the total assessment, we "staff" each patient discussing the physical limitations, dietary needs, psychologist needs and vocational potential. We teach them relaxation, using our psychologist and two of our exercise physiologists, and "demand" that they do this for the first three months and encourage participation thereafter. They have had enough repetitions of the techniques that they can at least practice this at home or work. Individual and group therapy is available and includes behavior modification, stress management, smoking, and any specific problems determined.

We still have many, many physicians who think that once a patient has had a heart attack or once they have gone through surgery, as initially seen in valve surgery, these people are unable to work and should be retired. "They have a sore chest and can't lift; they can't do this or that exercise." Well, they can do everything. As we look at these patients three to six months following the time they had their surgery, they are really physically more able and more capable than they have been in the previous 10 years, for the most part. They can walk-jog farther, have more stamina, have lower resting heart rates and all these things that disease and age worsens if allowed to do so. The other problem related to returning to work is the restrictions now present in the employment manuals of various industries related to heart disease. The transportation industry - specifically trucking, airlines, public bus drivers - has a combination of union restriction, insurance control, and

company policy that eliminates from work an employee who is probably much more capable and safer than he has been for many years. Our ability to get the patient back to work and never let him get far enough into the sickness system to apply for disability will best prevent unemployment. As you know, once a patient gets past six months of unemployment, he frequently is in the welfare system. As another aside, we have seen patients both with infarctions and bypass who come into the program, are doing well, and improving markedly until that first check from Social Security. There you can almost write them off. They start having more complaints than you have ever seen. One of them developed a "Shim Rock" because the swimming pool water had the wrong chlorine in it - the same water he had been in for three months.

In summary, the post-operative patients you have need to be told that they are not cured when the angina is gone. They are cured only until the next vessel becomes obstructed. Many surgeons have not emphasized that fact to the patients, and this may be our part of the therapy. They talk about cure so much in surgery for cancer and in other problems that the patient frequently feels that nobody could possibly have this kind of scar without being cured, but that is not the case. If you look at the numbers of repeat surgical bypass procedures done in our country the past year, there will be no question in your mind that what is being done is palliative and not curative.

The booklet given the patients in the Community Rehabilitation Program discusses the reasons for risk factor control. We let them chart their functional capacity, weight, cholesterol, and all the other measured variables just as other mechanisms of reminding them on a day-to-day basis that they had surgery, the pain is better, but they are not cured. We need to keep things from happening again. Thank you very much.

## PATIENTS IN EXERCISE TESTING AND TRAINING

### Patient Psychology

Thomas P. Hackett, M.D.

There is a good deal of misunderstanding about the term depression. I would like to clear that up and start off by discussing depression in a historical light. If you look at depression as an extension of grief, you may find it easier to understand. Grief is probably one of the best studied of the psychological phenomena in this century. Most of this study began in the mid-1940's with Erich Lindemann who was, at that time, at Massachusetts General Hospital. His work with grief began the evening that a nightclub burned to the ground with a loss of 500 lives. The nightclub was the Coconut Grove, and the time was November, 1942. Lindemann made very careful observations of the ways in which survivors responded to their loss and defined the grief reaction in terms of its symptoms, course, and prognosis. He also intellectually separated normal from pathological grief.

There are three stages in the complete grief reaction; these stages can be found after a myocardial infarction or after any illness in which there is a loss of function. The first stage Lindemann called the stage of denial or disbelief. In this stage the bereaved cannot fully believe that a loss has taken place. This is especially so if the loss is sudden and unexpected as was true in the case of the nightclub victims. The stage of disbelief or denial lasts only a few days, but during that time the person is haunted by memories--very vivid memories, almost daymares, which are like nightmares in their vividness. They sometimes hallucinate the lost person; they believe they see him walking down the street or hear him, and in fact they sometimes seek out that person until they realize they have got the wrong party and simply misidentified the source.

The next stage in grief is the stage of acceptance. It is here that the true picture of depression emerges. This lasts for about three months and is followed by the stage of reconstitution or assimilation. In the period of assimilation, the individual begins to take up his life again, to look for new meanings in life, perhaps even to look for another partner, and to continue his old ways of behaving. The entire grief reaction takes from three to six months. Length is determined largely by the importance of the person who died or the importance of the lost function. This is not too far different with myocardial infarction; most people following an uncomplicated MI are back to work in about three months.

Let me now talk about the second stage of grieving which is the stage of acceptance. The individual realizes that he has lost a close relative or a loved one and sets out to do what he can to get over the terrible sense of loss that he feels. I would like, at least for the time being, to refer to grief and depression interchangeably in this discussion. They are quite different, but for our purposes we would not get into difficulty by considering them one and the same. When you look at the symptomatology of the post-MI depression, just as if you were using grief as a model for depression, you realize how much this depression is a physical illness, not just a mental one. Very often the fact that depression has a strong physical component is forgotten by the ranks of internists and cardiologists. Regard the major symptoms for a moment. As Lindemann described them, and as we

know them to exist, they consist of a feeling of hopelessness, a strong sense of anxiety, deep sighing respirations, agitation, the inability to sit still, or its counterpart, the inability to move about very much. There is either retardation or agitation. Next are appetitive disturbances--either anorexia or hyperphagia. Next there are the sleep cycle disturbances with sleep-wake reversal being the most common. Remember, there are very few illnesses that cause early morning wakening, and when you see that as a marker in an illness, you realize there must be a strong biological component. Something interrupts the sleep-wake cycle and wakes people up around 4:00 in the morning. This is almost always pathognomonic of a depression. I can't think of many physical illnesses that give you that particular sign. When you see it, you can almost certainly suspect an underlying depression. The next symptom is the sense of lassitude or easy fatigue, a chronic sense of tiredness and almost always accompanied by a loss of libido. The latter need not only be sexual, but it could also mean a loss of interest in jobs, hobbies, and sports - in anything the individual held dear before the loss. I think that a loss of interest in sports is particularly important in this culture. If a spouse reports that a mate no longer likes to watch the Red Sox or the Dodgers, that's usually a sign that some basic change has taken place, and generally it speaks for the presence of depression.

Along with the above there are a slew of physical symptoms ranging from headache through palpitations, weakness, malaise, all of which are characteristic of a depression. There is one other which I mention because it is so often ignored. This is difficulty in concentrating and a sense of failing memory. Sometimes these two mental symptoms, in conjunction with the physical, make the individual feel that he is "cracking up" or "losing my mind." People in executive positions who are responsible for many things and are apt to hold many facts in their head at the same time are particularly vulnerable to the memory disturbance and failure to concentrate. They can't listen to somebody talk and remember what was said after a short passage of time. They think they are becoming senile. Again this is quite pathognomonic of depression. Generally speaking the patient tends to exaggerate this defect, to see it as being more serious than it actually is. As a consequence you not infrequently find a spouse who will claim that the patient thinks his memory is failing while in fact memory is still pretty good. The subjective sense of memory impairment is the important thing, because very often the physician cannot corroborate it by doing a test of mental status. At any rate, even if memory loss is present, it is reversible in the case of a depression. It clears up when the depression clears.

As Lindemann described the grief reaction, it usually lasted for about three months, although it could go on for a longer period of time depending upon who was lost. If a mother lost a child, usually the grief went on for a year or two or perhaps three and sometimes for even longer. Women who lost children were the most severely affected while most of the people who lost spouses generally got over their grief within a year's time. The exceptions are older people, those who have been married for a longer period of time; they tend to recover much more slowly, and George Engel and others have pointed out that the death of a spouse is not infrequently followed by death of the grieving partner.

Pathological grief consists principally of two particular subtypes. One is prolonged grief, grief that doesn't resolve in three to six months. The second type is delayed grief; this is the grief of the individual who does not grieve at all immediately following a loss, who somehow is able to hold it in, but for whom grief is a problem later - sometimes years later - and almost always in a more severe form.

Let me now get on to the post-MI depression. Most of the symptoms that I have mentioned before can occur in a post-MI depression, but usually they are in milder form. When Ned Cassem and I began to work with MI patients, we described the post-MI depression as a homecoming depression because it was not manifest in the hospital but became evident only when the individual returned home. In the CCU and in the step-down wards, one can make rounds on patients following an MI and probably hardly be aware of a depression. These patients will not be crying; they may be concerned, but their concern usually focuses on very realistic things. Generally this concern begins to become evident on the third day in the CCU. It is at this time, when the acute dangers have worn off, that they begin to ask, "What is going to happen now? How much work will I be capable of? Will I be able to be a good father and husband?" The real depression comes when they arrive home; it is generally apparent within the first day. It is our impression that this depression originates in the sense of profound weakness experienced in walking about the home. Unless they are fortunate enough to be in a hospital where there is a conditioning program or an activity program, these patients are usually confined to their bed space or to their room until discharge. It is in walking from their car to the front door or walking around their living rooms--particularly if they mount a small series of stairs--that they begin to experience profound fatigue. This baffles them. They were told they were fine. They had graduated from the hospital. No one had prepared them for the sense of appalling listlessness that they felt with minimum activity; almost invariably they attributed this exhaustion to cardiac illness. Some felt they hadn't been told how seriously ill they were. They had been told nothing about the inanition syndrome or what happens to athletes when they are put in bed.

Usually the lassitude or the sense of apathy or weakness that comes is the first of a string of symptoms which I have already mentioned to you under the heading of depression. Usually patients with this homecoming depression don't complain very much, although I am sure their spouses realize they are under the weather or "not themselves." Usually the homecoming depression is characterized by more physical distress than is the grief response. In other words, symptoms such as dizziness, headache, and palpitations are all the more evident; the sense of being depressed or of being hopeless is secondary. Sometimes when patients come back for a three week follow up, they still don't complain of being depressed because many of them don't know what a depression means. I change that term as much as I can and use the vernacular, "Are you feeling sad or blue or under the weather?" I try to avoid a complicated word like depression and almost always tend to tell them that most people get discouraged in the first months after an MI. I encourage them to tell me if this happens to be the case with them.

The symptoms that are characteristic of depression again, are: sleep disturbance, appetite disturbance, fatigue, psychomotor agitation or retardation, loss of interest in activities and sex, poor concentration, feeling of guilt and self-reproach. One I didn't mention before is the recurrent thought of death. This need not be a suicidal thought although that can be part of it. If any five of the above symptoms are present for over a month, the patient is depressed, but it is a depression that will probably improve on its own.

Let me briefly tell you some of the things we do to help these individuals. Most important is to anticipate the physical weakness. We tell them they are going to feel weak when they get home, and we tell them why this is so. We also anticipate the depression. We let them know that everybody gets depressed after an MI. This is not an exaggeration. I have met very few people who had an MI who don't in some way get depressed, or have at least

three of the symptoms mentioned. We then explain that depression is par for the course, is self-limited, gets better in about three months, often at/or about the time the patient goes back to work. We don't tell them this next point, but very frequently the depression begins to get better when they return to sexual activity, and that, of course, is one of the clues or one of the predictors that they are going to go back to work. If they return to sexual activity, they usually go back to work. We strongly suggest that a program of education be offered these individuals on diet and that some sexual education be given as well.

We spend a lot of time demythifying heart disease because there are so many myths around such as "don't get excited," "don't raise your hands above your head," "don't laugh too hard." The MI sick role comes equipped with a host of built-in myths. It reminds me of an experience I had in the service when I was a prison doctor. Three inmates went over the wall. As they were running across a field, rifle shots rang out, and one of the inmates fell over. I thought to myself, "They must have got him in the chest." I had to go out and get him, and when I did so, he was lying there, and although there was a great deal of blood, the bullet had barely nipped his shoulder. As he lay there panting, I reassured him and told him that he was alright, and then I asked him why he had fallen down. He replied, "Oh, you're supposed to fall down when you're hit." So he took on the role of the escapee who had been shot down and fell, not because of the bullet's impact, but because he thought he should. I see a lot of people doing the same thing with heart disease, and I generally use this example to separate the sick role from the fact of sickness. Many MI patients feel they ought to be invalids because they are told that heart attack victims are invalids. They feel they should be over the hill following an MI and therefore assume that role. They feel they can't do what they did before, a fact which is reinforced on all sides by relatives who point out that is just exactly the case.

In order to make a thorough demythification we generally ask people what they have heard about heart disease. We ask what their expectations are. We then give examples of people who have heard ridiculous things, such as a man who had been told it was dangerous to go into a deep sleep because one died following an MI during deep sleep, therefore he refused to take any sleeping medication. We also explain the fear of anniversaries. Often times a cardiac patient will fear the anniversary of his father's or mother's death might prompt his own demise. We discuss all of these features and encourage the patient to reveal his own fears, no matter how silly they may seem.

Activity programs are a real boost. If you add an exercise program, this is an additional benefit. Probably exercise and activity are the best available treatments for post-MI. Whereas relatively severe depressions in the post-MI patient can be treated with antidepressants, one would like to avoid such medication if possible because its use has been linked to rhythm disturbances. Most post-MI depressions don't respond to psychotherapy unless there is a history of neurotic problems before the MI. If an exercise program were initiated early in the MI convalescence, I would imagine the extent of depression in this population would be lower than in another population with all variables controlled. Recommending a patient to an exercise or activity program is one of the best things to do for the moderately depressed individual. I think of the person that one would not want to start on antidepressant medication but would start on a course of positive thinking.

Exercise programs impart a sense of confidence and self-determination in patients. Ned Cassem and I have been in favor of this approach ever since it came on the market. One

has to be careful about recommending this form of treatment, however, because a large number of patients are turned off by exercise and find it most unpleasant. Whenever I make such a referral, I use myself as an example. I tell them that despite the fact I am somewhat obese, I have jogged between two and three miles a day for the last ten years. I go on to say that I dislike the activity. It bores me. It is often painful and uncomfortable, and the only thing good about it is the shower I take at journey's end. I don't feel any better, but I still think it is a sensible investment of time. The difficulty often comes in over-selling an activity program, in encouraging the patient to think he will experience a sense of joy through jogging. Most of the people who have followed up our referrals to exercise programs were athletes in their young days. It is unusual to turn a nonathlete into a jogger or runner. I don't know what the secret is, but it is of vital interest to us to find a good way to motivate people into activity, to motivate those who ordinarily would not turn to this type of activity.

If there is a heart club in your neighborhood and you have checked it out and found it to be composed of respectable people and run by a qualified leader, I would recommend that you use it. Having groups of people get together after they have experienced an MI provides a number of opportunities for the exchange of information, for the discussion of personal experiences. Discussions may have relevance to another member and may exert gentle group pressure toward modification of destructive behavior, such as smoking. Since many of these heart clubs act as a springboard to exercise or activity programs, they are particularly valuable. My initial exposure to such a group was run by a nurse clinician experienced in group techniques and also in cardiology. She spent a good part of her time answering questions and encouraging the group members to share their experiences. It was a highly profitable experience for these patients as evidenced by their desire to continue meeting long after the closure date had been reached.

Relaxation techniques and autohypnosis have been mentioned in the literature. I believe these are alternative methods - alternative to an activity program. Sometimes people who do not like to exert themselves are willing to put aside a certain amount of time each day to practice progressive relaxation or autohypnosis. The important thing about these activities is that they are not panaceas. While one can learn to relax with practice and some coaching, the same does not apply to autohypnosis. You either have that ability or not, and if you don't, no amount of practice or training can provide it. How much value these approaches possess I don't know, but I favor them as alternatives to exercise because at least they provide an activity for the patient to engage in and also impart to him a sense of responsibility for his own health care.

When depression is more serious, we treat it with tricyclic antidepressants or MAO inhibitors or ECT. Having a myocardial infarction does not restrict one from such treatment. I would suggest, however, if the patient falls into this category--that is, if the depression remains after 2-3 months and seriously interferes with his work life or social life--he be referred to a psychiatrist who can take responsibility for his treatment.

THIRD PARTY PAYMENT FOR EXERCISE

TESTING AND PROGRAMS

Services, What Patients, How Long, Requirements

Robert W. Hoffman, M.D.

Thank you very much for having me down here. I recognize that being an insurance company bureaucrat, makes me an outsider. Were this a western movie I'd be the guy who rides into town wearing the black hat. Actually, you have made me feel very welcome and I have learned much from you -- so much in fact, that I abandoned most of what I had intended to say and will confine my remarks to some ideas that came to me as I listened to the rest of you.

Some of what I say might be in conflict with your personal experience. If that is true it will only confirm what we already know or strongly suspect; that the health insurance industry has been a little remiss in designing coverage for Cardiac Rehab programs.

Third parties are going to have to make up their minds about Cardiac and other types of Rehab programs. Nine out of ten people have some form of health care insurance, and financial success or failure of new programs depends more and more on the willingness or the ability of third party carriers to pay all or part of the costs. The indecisions of my industry can handicap good programs because you don't know if we are going to provide financial support for your services, and we are sometimes capricious and arbitrary in the determinations that we make. I admit to those things, but believe that talking together, as we are doing here, will help you to better predict what the health insurance industry will probably do.

Recently, I reviewed a survey that Blue Shield made in the summer of 1977, a simple query to the various Blue's Plans around the country asking what they were doing about Cardiac Rehab programs. The response from the plans in 1977 was rather poor. The answers were often cavalier. There didn't seem to be a lot of interest, and coverage was spotty. The survey was repeated in 1978, just a summer ago, and this time the answers were much more sophisticated, showing a great deal more interest in the responsibility of the Blue's to Cardiac Rehab programs and the coverage in general was more generous. This suggests that Cardiac Rehab programs are doing a better job of proving their worth to the carriers.

You might be interested in how a third party's medical director views a Cardiac Rehab program. First, there is a graded exercise testing of patients with cardiovascular disease. This entrance testing is then used to develop a program of progressive exercise over a fixed period of time. Because of the exercise program, the patient, who is our subscriber, becomes less apt to experience a major cardiac event and is, therefore, a better insurance risk. And let's not fool around with what I mean by a "better insurance risk". Exactly what I mean is that in the foreseeable future he will be a less expensive subscriber for the carrier, taking fewer numbers of dollars out of the premium pool.

The concept of reducing risks is heady stuff for an insurance company. It is what we mean by the term "cost effective", for it conserves premium dollars. Programs are judged

by clinicians in human terms, but an insurance carrier must also view new ways of doing things in dollar terms. And as more of us begin to recognize that programs like Cardiac Rehab are "cost effective" then we will become interested and commit ourselves to their support. But that support often takes substantial amounts of additional money, which has not been underwritten into current contracts and premiums. The service may save a lot of money at some indefinite future but it has to be paid in dollars now. What is often viewed as indifference or myopia in the health insurance industry is frequently the reflection of our inability to afford what is new, no matter how good it really is.

Having opted to support a program like Cardiac Rehab, the first thing we do is break the testing program away from the actual exercise sessions. Insurance carriers like testing -- it is something with which we have a lot of experience -- we pay for millions of tests a year. We can give it one of our sacred little five-digit CPT codes, profile it and develop a UCR fee, and apply utilization parameters. Because testing adapts itself to standardization we can assure quality and proper utilization. But the exercise sessions gives someone, like me, the medical director of an insurance plan, itches and fits. A medical director drops into an exercise session of a Cardiac Rehab program and watches what is going on. Almost invariably he will go back to his desk with some pretty serious thoughts about medical necessity and cost effectiveness, and his role as the steward of other peoples' money. We would like to get into it, but we have some problems with what we see. The testing is fine -- the exercise sessions are a different matter.

Some insurance plans decide that the exercise portions of Cardiac Rehab are properly considered "physical therapy", and this is convenient for most physical therapy benefits are limited. The number of sessions can be agreed upon in advance and the risk of the unknown is reduced. In all probability, Cardiac Rehab programs of the future will be built into major medical benefits with broader coverage, and in the next year or two you will all be a little happier with what you see developing.

I am from a Blue Shield Plan and about four years ago we came to an agreement with our local Cardiac Rehab program. Lacking experience in that sort of thing our coverage was admittedly arbitrary, in that we required our subscriber to have home and office calls. This made it technically possible for us to code the services and pay for it out of existing premiums. We insisted that the participant be a post-myocardial infarction patient or to have recently had open heart surgery. Under our agreement we honored the entrance and the exit exercise testing, and initially gave 36 exercise sessions in three months. This was soon expanded to a 6 month exercise period with 72 sessions. We agreed to pay \$6 per exercise session. The entrance and exit exercise testing and the 72 exercise sessions generated a risk for us of about \$600.

But we were not to experience that \$600 risk per participant. In 1978, and it has been a pattern that has continued, our average subscriber who used the program generated costs of only \$167 of the \$600 that was available. This means that either the patients are getting well very fast or that a great number of them are leaving the show after the first act. Quite clearly, it is the latter. Spreading the \$167 out over all of our individual and group coverage people, the risk of the Cardiac Rehab program amounted to only 62 cents per year for an average family. Now you have to be careful and not assume that any Cardiac Rehab program can be serviced for 62 cents a year for an average family. We could do it for 62 cents because of the rigid limits that were placed on the program and the nature of the program itself. The program is obviously poorly used. I did some additional arithmetic and discovered that one in three thousand people we cover are using the program -- not a high utilization at all. This makes it inexpensive, simply because it

is not used. One in three thousand subscribers does not reflect the experience in other parts of the country, and if our local program were improved, and its my very personal opinion that it could stand just that, the referral rate would be higher and the utilization would be greater.

I believe that a better program with somewhat better coverage would increase the utilization by a factor of three, and our actuaries say that this would increase the cost from 62 cents to around \$5.67 per family per year. But even this is a small amount when added to the individual family premium. The cost of \$5.67 a year suddenly becomes quite conspicuous when, for example, it is part of a labor contract health benefit negotiation. Let's say that Brand X Company is negotiating with its union for health care and other wage benefits for 35,000 employees and their families. We suddenly have to multiply \$5.67 by 35,000, and that is just a little bit over \$200,000. Brand X says to us, for \$200,000 show us that it works -- and the Union at the negotiating table says -- before you take \$200,000 out of the payroll convince us that you are not paying for "fun time". I have heard those kinds of words.

Cardiac Rehab programs are not static. My industry is going to have to recognize its responsibility for coverage of increasingly complex exercise testing on entrance and more frequently during the course of the program. We will have to consider seriously the value of some of the things that Dr. Miller pointed out, such as dietetic consultations and a psychologist as part of the team, vocational and occupational therapy, to mention but some. But the services, worthwhile as they are require lots of additional money and the price of a Cardiac Rehab Program can become very high. Maybe, instead of \$5.67 a year it could take \$10.00 to protect an average family. Now Brand X company must consider a price of over \$400,000, and somehow we have to show them that Cardiac Rehab really works. These are the kinds of realities that we face.

Before I step down I would like to say a few words about the almost inevitable proliferation of Cardiac Rehab centers. Payment for their services by the health insurance industry will prove an almost irresistible incentive to the development of more and more programs. A month ago I went to a small town in Central Washington, a community of a few thousand people, with a handful of doctors. As I told someone yesterday, the little town isn't the end of the world, but you can see it from there on a clear day. The physicians were requesting coverage for a Cardiac Rehab Center. Obviously, I had to say no, explaining that I could recognize a program only if it reasonably met the very exacting criteria which the American Heart Association published in Circulation for February of 1979. I believe that we must insist on the highest possible quality in every Cardiac Rehab program or we will soon be providing little in the way of medical care and spending precious dollars for fun time.

Here we have been talking about Cardiac Rehab. In my business I also hear about Rehab for Stroke victims, Cerebral Palsy, children with learning disabilities, drug and chemical abuse and on and on. There are only so many dollars available and the demands on them increase and increase. As a Medical Director I look first at (and seldom beyond) a new program which is proven to be cost effective over the short term and which can be standardized to insure quality and utilization control.

In the past day and a half you have done much to assure me that Cardiac Rehab is deserving of the attention and support of the Health Insurance Industry.

Thank you very much.

## INDUSTRIAL PROGRAMS

### Eligibility Program, Company, Free Time, Results

Richard Keelor, Ph.D.

It is a pleasure to represent the council and extend greetings to you and to commend AHA and those respective associations that you represent for your continuing efforts to promote the concept of preventive health and preventive cardiology. Let me give you a brief overview of what the President's Council on Physical Fitness and Sports is and how we work because that might be news to you. It will not be news to one of your principle presentors, Dr. Samuel Fox, III, who is a consultant of the President's Council, formerly a member of the council and most influential consultant on all matters, particularly those matters related to cardiology and preventive medicine. The President's Council on Physical Fitness and Sports is a very peculiar little outfit. "Little" is a euphemism -- it's really "tiny" -- only five professional staff people. You are all familiar with the sea of bureaucracy in the capital and particularly the public health service to know that it is indeed small.

To compound that dilemma we have a very small budget of about \$800,000 -- that's total budget. How can anyone expect anything to be accomplished with such a small staff and budget? The wisdom of the executive director and council members, such as Dr. Fox and others, have led us down a road that says you use the money and staff as a catalyst to plant seeds, to motivate, to provide linkage between groups of people and you try to promote - not buy programs, or give money to the American people or institutions or organizations - but try to promote the concept of preventive health, particularly that part which involves regular exercise. If you do that, you can generate a lot of support, among those already in position in communities in states and nationally who have the manpower and who have the budgets. Given the right leadership, the right linkage and perhaps, some good ideas, you can generate a lot of support. That's the way it has worked. That is the way we conduct the national program.

We run a national public information campaign on radio, television and printed page which, perhaps, you have seen. We run about \$35,000,000 worth of program each year sponsored almost entirely by the private sector. They are well presented -- in a commercial way -- done by creative minds who know how to sell.

All the appropriate medical supervision and clearance and everything that good practice dictates, will be a part of these recommendations. Whether it's youth, school-age child, pre-school, the adult, where we've made probably the most significant progress in this country, or the elderly, our job is to link together organizations, groups of people, private money, to solve problems. We're constantly reminded by our friends in nutrition that there is more to fitness than exercise and we are reminded by those in areas of other health behaviors, like obesity control and smoking control also. We use the term health fitness to try to eliminate that, because we're really talking about a program that is much more comprehensive than just exercising; although, exercise is the principle modality. Let me describe how the President's Council on Physical Fitness and Sports views the current state of affairs with employee health fitness and how those programs work. Principally, the health fitness program is a promotional program. I use the word "promotional"

carefully because it differentiates from education, health education, in that it is an effort through visualizing the work place as a delivery system, as a health environment to promote healthy lifestyles through everything from the cafeteria to the posters on the walls, to special events, to some things that are almost subliminal in nature, that is normally conducted by a person being wise about the application of health, the lifestyles to preventing degenerative disease is also a good model. That might be the big difference between health promotion and health education. Health promoters are normally good models for the product they have to sell and they are sales people. They are enthusiastic and they use all kinds of interesting motivational techniques within an industrial setting to get people to exercise regularly and to participate in other health education programs.

The health education program gives information with data, research, slide presentations, lecturers and the traditional process of giving information. The health promoter, then, who normally is in charge of programs, is a person who does that, as well as promote alternatives in the cafeteria, to the traditional company cafeteria menu of hamburgers, french fries and chocolate malts or other less than nutritious meals to alternative lines. Let me give you an example, the other day on my way to lunch, my host excused himself for a moment and got into what I thought was the cafeteria line. It was a very long line. When my host returned he took my arm and we moved past this line. Actually, the line I was in was a line of people getting on a scale to assess their body weight and I imagine to make decisions about what they were going to eat when they went into the cafeteria. It took a promoter to dream up that little gimmick. It occurred to me that these people 1) were motivated and willing to stand in front before they went into the cafeteria for some period of time, 2) weren't embarrassed about it or inhibited in any way, and 3) they were making some cognitive calculations about their health with respect to weight control. Obviously, you could not do that as an opener in a corporate setting -- set the scale by the door.

That is a health promotional example of what I am trying to get across. In addition, the health fitness program in the corporate setting involves screening, there's normally a very intensive screening process, certainly the exercise stress testing is a part of many programs. Normally, the initial screening procedure is something less complicated and far less expensive. It involves paper questionnaires, multi-facet screening approaches, blood pressure analysis, blood chemistry, maybe risko inventory or some similar instrument that has the potential of identifying risk factors associated with lifestyles of various people. From that shake-out comes the stress test, which is applied to high risk people who are identified through this process. The big payoff, of course, is to identify the high risk individual and to demonstrate some change in that risk profile, so the company doesn't lose that person from the lineup.

Then, of course, there's the program of exercise, which is the principal modality involved in the health fitness program. The exercise program is unlike those that we have been shown in Mainland China or in some of the companies in Japan. A whistle does not blow and people do not fall out into the aisles doing jumping jacks to some leader positioned high in the rafters as he counts out the cadence. It's normally something that is similar to what you would find in a good YMCA program. The exercise leader always the key in the success of these programs that have high retention ratios and show the greatest changes in the health profiles of the subjects involved in the program, is always directly related to the leader, not to the facilities and all the elaborate electronic technology associated with stress testing which is for top management often a motive for having programs. They get very involved with the electronic technology of stress testing. The exercise

program involves most of the aerobic activities or the endurance activities that are commensurate with YMCA activities such as, aerobic dance, walking -- vigorous walking -- jogging, running, cycling, stationary cycling, treadmill work. There are often strength programs, a lot of flexibility work, much emphasis on rhythmic activity. Disco music is a great master of the fatigue and pain associated with the conditioning phenomena. Try to make it attractive -- make it interesting. Consequently, make it even more appealing to the person who is less likely to exercise.

There is normally an outreach program beyond the actual exercise program where people come in the health fitness program will include an effort to go out and contact the deconditioned non-exerciser who finds it too great a threat to go from the office down into the gym. These are people who have failed repeatedly, whose self-image is very low, who because of obesity and other personal physical characteristics are inhibited about -- or self-conscious -- about going out in front of a group. Of course, those are the great pay-offs, and consequently, if a program is only confined to the athletic minded individual, who is more receptive to the exercise concept, then, you are not going to have the great cost effect that you would if you had the outreach program. The outreach program is where the exercise leader goes out of the gymnasium or off the exercise floor into the offices, frequently, they go accompanied by some equipment such as a small cassette tape recorder; they do low stress kinds of exercises where people loosen their ties, kick off their shoes; and, with some interesting music go through a series of very low stress rhythmic exercises, shoulder circles, close the fist, open the fist, arm extensions. For the ladies, especially, they do some work on the abductors. They do a little deep breathing, maybe a little mild flexibility work, but it is an attempt to get the people to start to demonstrate and take some overt act towards exercise which, hopefully, later on will precipitate more courage, more self-confidence, and make them a candidate for the exercise facility.

Then, there's the health education phase. We are concerned about the program for example, where the management puts in the locker and shower room but they don't have any medical supervision; they don't have any screening before hand; that is the kind of situation where because of something read or heard, the symptomatic individual finally gets up the courage, puts on the warm-ups and goes out and precipitates the very thing we are trying to prevent. This is a big problem which we are continually trying to avoid by educating management that this is not the way to go.

We have this problem and it's a serious issue. Why is management interested in this concept of health fitness and why are they making these investments, what's the evidence that these programs indeed produce any measurable changes in the health characteristics of the work population. The research on that subject is very shabby, indeed. There is enough evidence at this point to suggest that several things happen of a positive nature in an employee health fitness program where that program roughly corresponds to the criterium suggested earlier. Mainly, it's medical supervising, use of screening, there is a high emphasis on the motivational promotion aspect of the program. The changes that occur are typical of what you would imagine them to be -- deconditioned middle-aged people who began a carefully prescribed monitored exercise program do all the things we know. They get lean, the stroke volume of the heart improves, their ability to respond to stress -- physical stress -- improved. There's often a loss of body weight, they're leaner and fitter people.

Heart disease is similar to any small group that you would see and it varies, of course, from one individual to the next. These physical changes take place. The incidence of any fatal event during the course of exercise has been extremely slow. I can report that we have no evidence - no reports - of a fatal coronary incident in any of the employee health fitness programs that occur on site. There have been fatal events off site on the weekends and people who are not in the program refuse to work under the supervision or to go through the screening process who just want a locker and just want to go out and run. Even those cases are very small, but there have been reports of a few.

Perhaps the most interesting changes that we see taking place are psychological/social. A study was made in which a randomized sample of males 35 and over were given an interval exercise training program preceded by the appropriate exercise stress test and follow-ups and screenings. There were physical changes, but there were also some interesting psychological changes. Morale improved. Absenteeism was reduced. These things, of course, are subject to the self-select variables that we can't control with human subject studies in a democracy, but who's to say the person was absent less because of the exercise program or because they were just very fit, vigorous type personalities to begin with. They did attempt to random sample in this case. There was an element of this particular research project -- all of which is available to your perusal by writing to the PC. But, they decided to do a "perceptions of productivity" analysis and in that, they asked the supervisors to analyze what they believed to be the productivity.

They saw the ultimate result was that productivity increased. These people also showed different changes in their lifestyles, they reported to be more concerned about the quality and quantity of food they ate; they were more active in their leisure time; they involved their families in more recreational activities that were of an exercise nature; they reported less stress and tension; and, they slept better. Another five-year study done in 1978, involving 800 subjects showed essentially all of the same results. They did just one thing in this program, exercised by running. They found all the same physiological changes you can predict, but again, they saw a drop in absenteeism and they used the risko inventory as their principal screening device to measure the risk profile associated with heart disease and that's subject to some question as to how valid that particular question is. Perhaps one of the most interesting features of that research was that when they took out the exercise variable; although, they had no health education component in this health fitness program; they found people had changed in many respects unassociated with exercise. The smokers were smoking less or not at all. Dietary habits had changed dramatically, activities patterns off the job, attitudes about health in general, with respect to a number of unhealthy life habits, had changed.

We see over and over again the same issue evolving and I suspect that some day the scientific community and the health promoters and the health educators will say "Yes, exercise is good, it has certain effects on the heart and vascular system, pulmonary system that reduce certain characteristics associated with heart disease." And, "yes, we do lose body fat and strength perhaps improved," but the most important thing is that it precipitates an attitude of mind. And perhaps, the smoke-enders and weight control programs that are approached from a singular point of view might better be done with exercise as a catalyst.

It is reported that it cost industry \$700 million just to train replacements of those taken from heart disease. Well, industry, of course, pays enormous taxes and each time the federal budget rolls out they look at that tax issue with great chagrin. They pay state

taxes and, of course, public health is a major consumer of those taxes. They pay insurance premiums and pay for the direct and indirect costs of losing employees, either permanently or temporarily and they are looking for options. They're also looking for opportunities to enhance productivity, ways to make work more interesting, ways to improve the attitude of people about going to the job site. We know in education that a lot of kids go to school because they want to be on the team. The absenteeism rate among the athletic program is very low. That might be because the kids are better conditioned and they're more vigorous and active kids and it might be because they are motivated. As a coach for a number of years, I know that many kinds who are athletes came to school unadvisably because they were so motivated to participate. They wanted to be there. They enjoyed the activity. And, so it is perhaps, with the health fitness program in the work place. The exercise event is very important, maybe there will be a connection, a productivity.

We believe that beyond the physical and health benefits of these programs the companies are beginning to find changes in the attitude of the worker among those who are involved in exercise are so significant that they are willing to stay with these programs and reinvest and in fact, advocate such programs to their peers. We often hold conferences, inviting industrial leaders to hear the medical testimony and the case studies presented by exercise physiologists and exercise technicians and people who run these programs. Not every company can afford the big programs, so we try to suggest this health fitness thing can be managed in a variety of approaches including the contracting of services with established fitness health organizations, such as the YMCA. Local hospitals are also becoming very interested.

Nationally, the American Association of Fitness Directors in Business and Industry, a small organization of about twelve hundred members who started their attempts about seven years ago with thirteen people involved with health fitness programs at the time, has grown quite dramatically over a period of years, and holds conferences each year. They will hold a national conference in Colorado Springs, October 22 through 26. At that time, they will have the corporate programs there to discuss the emergency service procedures, the screening, the medical considerations, the stress testing, the implications, the whole gauntlet of factors associated with health fitness programs, and that four days is normally a very stimulating experience, as most conferences are. These are people who practice what they preach so these conferences are often attended by people garbed in running and exercise costume. They are a very enthusiastic and exciting group of people to be around. They will relate in one full day research that is currently being conducted or research that has been done recently and has application to this concept.

The federal government has taken a very interesting look at the health fitness concept. The council is a part of the federal government so for the extent to which we are involved in this we are very active. We believe this concept has the implication that the work place is the ideal setting to deliver health promotion. We can't get to the adult nearly as well any place else than in the work place. They are there, they are not captives. It's a voluntary program. Sometimes these programs occur before work, sometimes at lunch and after work. Often companies start out that way and then they eventually give on-the-job time for the program. The federal government has initiated a number of health fitness programs for federal employees. We have exercise stress testing centers in two major agencies, the Department of Transportation and the Department of Justice. We have another stress testing facility in NASA, perhaps less elaborate, and while the jury's still out in terms of any research, we are identifying the high risk individuals; we have

found that in working with the private physicians many are showing significant changes in their health profiles with respect to heart disease, vascular disorders and low back problems, the whole gamut of the degenerative diseases.

The federal government has recently taken the position that any federal agency may start a health fitness program. They may spend federal funds on a health fitness program, providing certain criteria are present. They have to have at least a three-year plan that includes the acquisition of some staff, and other things we look for. Then they may, according to federal U.S. Code, start a health fitness program.

The way that most people are beginning these programs is to start off by contacting either us or some local representative of the ADPI. They have regional offices, directors they call. We recommend always that these programs need some professional input in the beginning. All too often the president of a company, a born-again fitness freak, decides that he wants to impose this upon everybody in the building, or perhaps the corporate medical director who has this inspiration and goes out and buys gyms and treadmills, and get everything all set up but nobody comes to the party, or at least not enough people, and the people they are most interested in don't seem to buy it.

I would like to conclude and have a few moments for questions and answers. We believe for example, the American Medical Association, through its influence and its valuable contributions through its educational arms can help promote health fitness such as many organizations are doing. Blue Cross, Blue Shield has been very active in joining with the President's Council on promoting the health fitness concept. Pamphlets, materials, educational programs are all important to stimulate top management to look at some of the alternatives they have. We think it's been demonstrated, not scientifically, not without question, but where it is being applied with reason and sense, where the dollar spent is not equated with success but with numbers of people involved, we find important things taking place. Physical fitness means good business, we believe it means good health, and the extent to which organizations are concerned about that, which obviously is great, then we would solicit your involvement and we would pledge our support, sitting down with you or your representatives, whoever else you might influence, to help design a health promotion for your association in advancing the cause. We believe that the two areas of greatest promise in the future years in the physical fitness area involve the industrial health concept and programs for the elderly. Thank you for your attention and I will be happy to react to any questions.

QUESTION:

You speak of industry, there is management and labor unions. Have you worked with unions as distinct from management?

DR. KEELOR:

Yes, we have . . . and that's an interesting first point because it gets to what I perceive as one of our biggest hurdles. Labor tends to be suspicious about management providing, and consequently we have gone to Labor, the AFL-CIO, top people in that organization. They have been very interested, have listened, have had us make major presentations to their local reps at their big national meetings, and I think we are going to see them jump on board, but they want to own it, and they want to take it in as a benefit. They want to actually take it to the bargaining table as a fringe benefit to their members. We would

like to help them develop a strategy where they can be in that position. I think that answers the question. Anyone else?

QUESTION:

How about the Shoemaker's kids, are they provided for?

DR. KEELOR:

Oh yes, that's interesting. What we are seeing take place in those incidences I have cited. The people have an interest and sell it to hospital management as an opportunity, as another revenue producing opportunity. In the cases of all of those I've cited, these are medical doctors who are into preventive cardiology, some area of prevention, who have developed a very good expertise in the area of prevention and the role of the health fitness concept. So they are strong authorities then they acquire people who have been in the health fitness setting in a work place to join the hospital staff. They develop a small entrepreneurial effort within the large hospital staff to address this opportunity.

We have a large number of materials we try to distribute including the research reports alluded to here. Again, I want to underscore the opportunities that are here to promote health and the President's Council, as I suggested right up front never intended to do it alone, we don't intend to buy into that with federal dollars. It's really your job and if we can help you, of course, we want to. We think the opportunities are significant.

## CARDIAC REHABILITATION UNIT SURVEY RESULTS

Henry P. Kayne

As Marketing Research Manager, at Medtronic, Inc., I am involved with several activities related to the rehabilitation area. Facilitation of this survey was one of those projects. You now have the survey results in front of you. I'll comment briefly on several of the survey items.

The very first paragraph will reinforce some of the comments that Dr. Hoffman had made earlier. The graph shows the years which the survey respondents reported as the beginning of their cardiac rehabilitation center. As you can see, something happened in 1975 that caused the number of centers to grow exponentially. If anyone knows what that catalyst was, I would appreciate receiving that sort of comment during lunch.

We have not identified all of the cardiac rehabilitation centers. I happened to be involved in a similar study about three years ago, and at that time, our survey indicated there were more than 300 cardiac rehabilitation centers in the U.S. If we take the 300 center figure and relate it to the rapid growth over the past few years, there should be a great many more centers than the 533 I'm reporting on today.

(By the way, if you notice the N's vary by question, it is because of the pattern of non-responses. Many centers could not respond to each and every item.)

The next table shows the relationship between the year in which the center began its operation and the bedsize of the institution. Dr. Hoffman pointed out earlier that smaller hospitals are getting more and more interested in the cardiac rehabilitation activity. If you look at the hospitals with less than 250 beds in size, you will note that half of them began operation of cardiac rehabilitation centers within the past two years. If you look at the larger hospitals (500 beds or more), those centers began operation in 1975 or earlier. Since one-half of the hospitals in the U.S. are 250 beds or fewer, and those smaller hospitals are where the growth in cardiac rehabilitation centers is taking place, I suspect you are probably looking at the tip of the iceberg. There is going to be a proliferation of cardiac rehabilitation centers over the next few years.

The next graph is the distribution of survey returns by American Hospital Association census districts of which there are nine. Again, these data suggest that not all of the cardiac rehabilitation centers have been identified. The graph presents the distribution of the sample return, but I believe there are many more centers on the West Coast and also in the New England area.

Dr. Hoffman, in his talk, mentioned patient drop-out rates. The next table presents additional drop-out rate information. Specifically, hospitals that began their cardiac rehabilitation centers earlier than 1975 tend to have high patient drop-out rates. The centers that are most recent (post-1977) tend to show very low drop-out rates. The group in between, 1975 through 1977, also has a high drop-out rate. The differences in drop-out rates by time period are statistically significant, but I'm not too sure about how that should be interpreted. Perhaps the newer centers have not been in operation long enough to give meaningful drop-out rate data.

The last two pages distributed to you are photocopies of the actual questionnaire with appropriate means and frequency distributions typed in by each question. The tables I prepared in addition were intended to be entertaining and interesting. I cannot comment on items which may be of clinical significance.

Questions six and seven on the first page show that the survey respondents represented hospital-based programs, primarily in-patient.

There was a small flaw in the survey relative to items ten and eleven. In item ten, we wanted to know the number of patients in the program. Item eleven related to capacity. But some respondents interpreted capacity as "additional capacity", and others interpreted it as "total capacity." The resulting figure implies that the centers are near capacity right now. That may be an erroneous conclusion.

Item thirteen shows the distribution of patients in the program by cardiac status. Dr. Miller quoted a figure of 31% for the post-surgery group. This survey reinforces that quite well with a 27% figure.

QUESTION. Those N's are the number of centers?

Yes, each completed survey represents one observation or center.

Regarding page two of the survey, items twenty and twenty-two are primarily my questions. For marketing research purposes, I was interested in knowing the extent to which people are purchasing equipment (bicycles, rowing machines, etc.) for home use. I was surprised the answer was as high as thirty-five percent. Item twenty-two shows that, in general, services tend to get reimbursement while cardiac rehabilitation equipment is typically not covered by a third party.

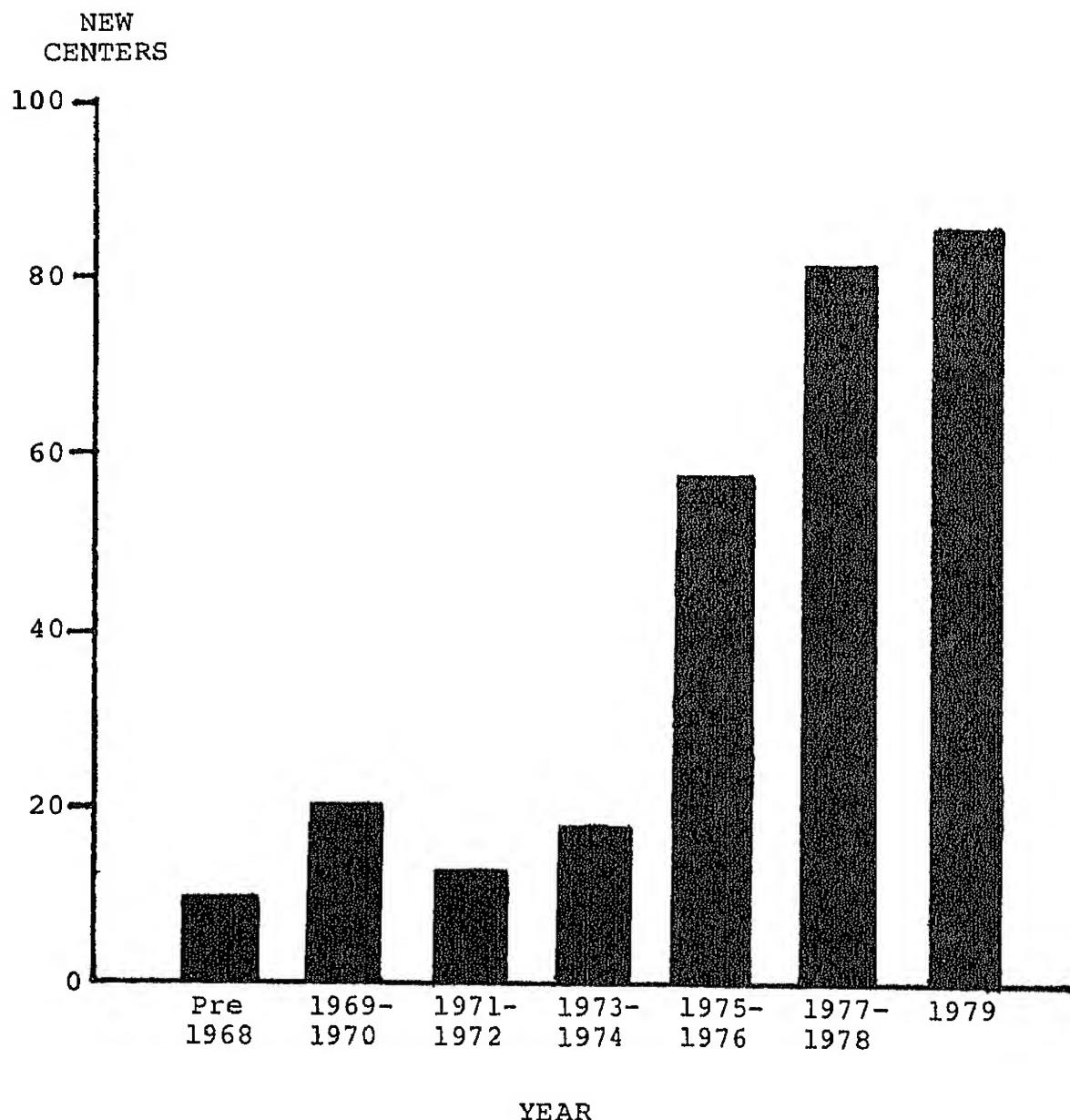
These data should make some interesting luncheon conversation. If, in reviewing the survey, you see other things you would like to see developed (correlation, crosstabulation, etc.), don't hesitate to ask. The information presented here is based on about 500 returns. We have received an additional 200 that have not, as yet, entered into the computer.

The methodology for the study was that the local affiliates of the American Heart Association identified centers which were to receive the questionnaire. All of the cardiac rehabilitation centers have not been identified. Ultimately, a directory will be published, and probably the result will be more centers seeking listing in that directory.

Thank you very much.

YEAR CARDIAC REHABILITATION  
CENTER BEGAN OPERATION

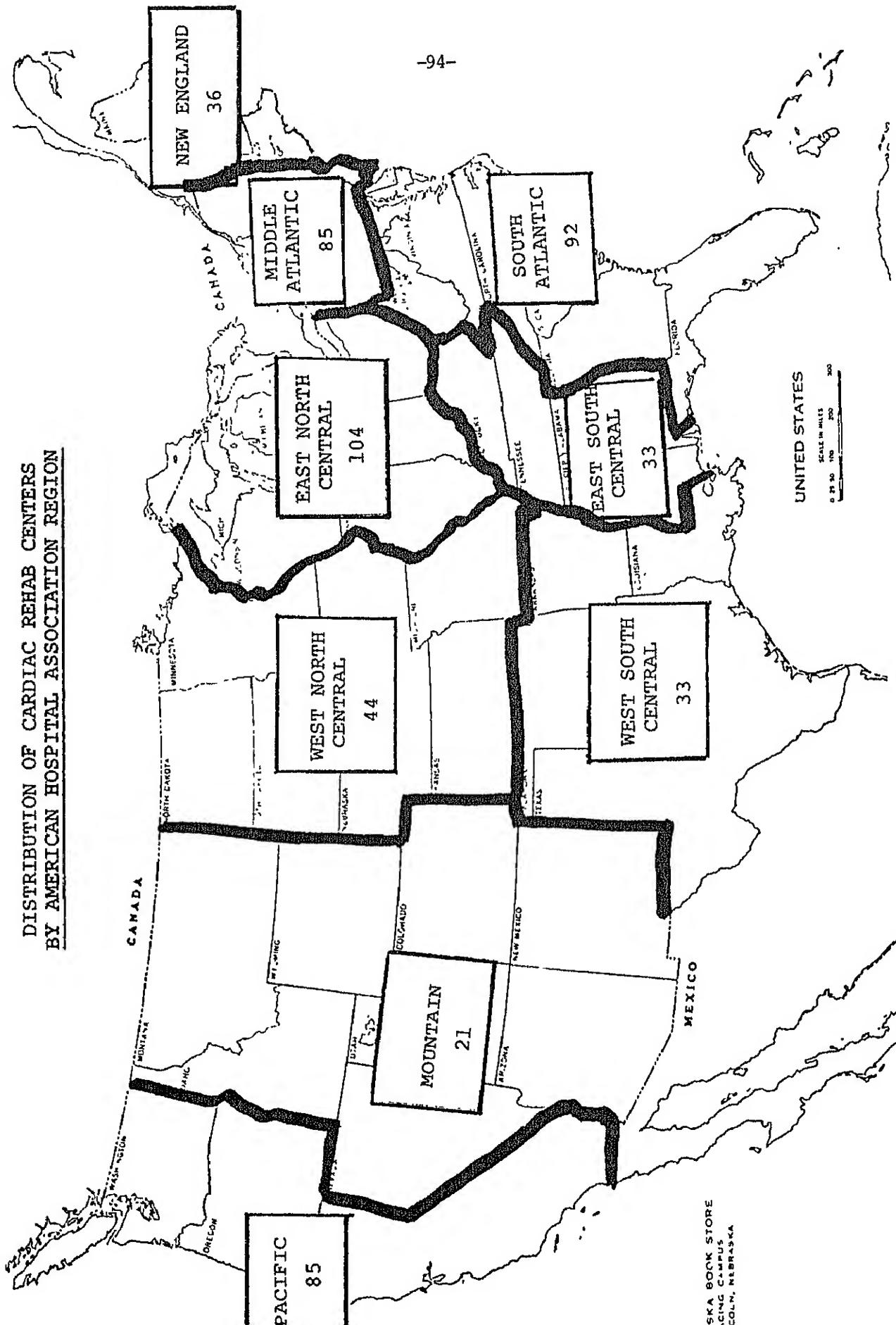
(N = 279)



YEAR CARDIAC REHABILITATION CENTER BEGAN  
OPERATION BY HOSPITAL BEDSIZE

<u>Year Began</u>	<u>Bedsize</u>			<u>Total</u>
	<u>≤ 250</u>	<u>251-499</u>	<u>≥ 500</u>	
Pre-1975	15%	21%	31%	22%
1975 - 1977	35%	30%	33%	32%
Post-1977	50%	49%	36%	46%
TOTAL	100%	100%	100%	100%
	(N=81)	(N=182)	(N=85)	(N=348)

DISTRIBUTION OF CARDIAC REHAB CENTERS  
BY AMERICAN HOSPITAL ASSOCIATION REGION



PATIENT DROPOUT RATES BY YEAR  
CARDIAC REHABILITATION CENTER BEGAN OPERATION

Patient Dropout %	Year			Total
	Pre-1975	1975-1977	Post-1977	
$\leq$ 5%	21%	37%	17%	25%
6% - 29%	52%	49%	64%	56%
$\geq$ 30%	27%	14%	19%	19%
TOTAL	100%	100%	100%	100%
	(N=71)	(N=92)	(N=101)	(N=264)

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$x^2 \geq .01$

**AMERICAN HEART ASSOCIATION:  
SURVEY OF CARDIAC REHAB CENTERS**

-96-

1. Name of Unit \_\_\_\_\_
2. Mailing Address \_\_\_\_\_

**Average Hospital Bedsize - 410 (N=468)**

3. Name of Director \_\_\_\_\_
4. Telephone Number \_\_\_\_\_
5. Date unit began operation 1976 (N=482) Range - 1955 - 1979
6. Which best describes the setting of your CRU?
 

84% Hospital-based (housed in hospital)  
10% Hospital-allied (administered by hospital in a separate setting)  
9% Independent or free-standing program  
6% Other (describe) \_\_\_\_\_  
 (N=528)
7. With which of the following is your CRU program involved? (Check all that apply.)
 

78% In-patient (early cardiac conditioning)  
76% Out-patient cardiac rehabilitation  
50% Patient home programs (exercise on own but monitored at regular intervals by your CRU)  
47% Supervised maintenance/conditioning program  
15% Other (describe) \_\_\_\_\_  
 (N=529)
8. What is the average duration of each type of program?
 

2.2 Weeks, in-patient (early cardiac conditioning) (N=375)  
17.5 Weeks, out-patient cardiac rehabilitation (N=355)  
24.2 Weeks, supervised maintenance/conditioning program (N=165)  
21.2 Weeks, prescribed home program (N=137)
9. What percent of participants drop out prior to completion of the recommended program?
 

17.4 % Drop out of program prior to completing the program (N=349)
10. Approximately how many participants are served by your program in a typical month?
 

48.9 Individual patients (N=478)  
26.8 Other family members (N=211)
11. How many patients could be served by your program?
 

77.4 Patient capacity (N=431)
12. What is the age distribution of participants in your program?  

Age	(N=398)	(N=200)
	% Male	% Female
< 45	<u>14%</u>	<u>7%</u>
45 - 65	<u>67%</u>	<u>67%</u>
> 65	<u>19%</u>	<u>26%</u>
TOTAL	100%	100%
13. Indicate the percentage of participants in your CRU program by cardiac status.
 

17.9 % Angina Pectoris (N=391)  
62.1 % Post-myocardial Infarction (N=466)  
27.0 % Post-surgery (N=378)  
16.4 % Coronary prone (more than 3 risk factors) (N=224)  
9.4 % Normals (no evidence of CHD or risk factors) (N=63)  
8.6 % Cardiac neurosis: emotional concern with or without organic heart disease. (N=127)  
8.9 % Other (specify) (N=97)

14. Indicate below the program services of this unit (check all that apply.)

-97-

- (a) Risk factor screening and reduction (N=509)
- |                              |            |                            |
|------------------------------|------------|----------------------------|
| <u>87%</u> Anti-smoking      | <u>80%</u> | Hypertension control       |
| <u>96%</u> Diet              | <u>95%</u> | Patient - family education |
| <u>79%</u> Stress management |            |                            |
- (b) Graded exercise testing: (N=475)
- |   |  |  |
|---|--|--|
| <u>84%</u> Diagnostic                                 |  |  |
| <u>94%</u> Exercise prescription for cardiac patients |  |  |
| <u>48%</u> Exercise prescription for apparent normals |  |  |

15. When is exercise testing performed? (N=471)

<u>74%</u> Early (post-MI, suspected angina, etc.)	Bruce -	192	52%
<u>81%</u> Pre-program assessment	Balke -	15	4%
<u>77%</u> Exit (at completion of conditioning phase)	Naughton -	7	2%
<u>44%</u> Bicycle (N=478)	Ellestad -	2	-
<u>7%</u> Steps	Combinations -	127	35%
<u>95%</u> Treadmill (specify protocol: _____)	Other -	25	7%
	TOTAL	368	100% )

17. Does the unit have a written plan for handling cardiopulmonary emergencies that might occur — (N=468)

	During Exercise Testing?	(N=462)
Yes	<u>92%</u>	<u>89%</u>
No	<u>8%</u>	<u>11%</u>

18. Which professionals are typically on hand —

	(N=469)	(N=452)
Physician specialty: (Please check [✓] one)	<u>93%</u>	<u>45%</u>
61% <input type="checkbox"/> Cardiologist, 12% <input type="checkbox"/> Internist		
2% <input type="checkbox"/> Physiatrist, 3% <input type="checkbox"/> Other (Describe: _____)		
<u>Combination of Above - 23% )</u>		
Registered Nurse	<u>54%</u>	<u>77%</u>
Exercise physiologist	<u>17%</u>	<u>25%</u>
Other exercise specialists/technologists	<u>45%</u>	<u>40%</u>
Other counselors	<u>3%</u>	<u>13%</u>
Other (describe: _____)	<u>13%</u>	<u>25%</u>

19. Which lead configurations are typically used during testing? (N=487)

17% Single      84% Multiple

20. Approximately what percent of participants purchase stationary cycles, etc., for home use?

34.7 % Purchase own equipment (N=328)

21. What is the principal source of funding for the center's staff? (N=439)

97% Patient fees      5% Grants      3% Bequests

22. Which best describes third party coverage when the following is prescribed by a physician?

	(N=394)	(N=281)
Coverage	Cardiac Rehab Services	Cardiac Rehab Equipment
Rare	<u>11%</u>	<u>48%</u>
Occasional	<u>11%</u>	<u>28%</u>
Frequent	<u>56%</u>	<u>21%</u>
Always	<u>21%</u>	<u>3%</u>

23. May we list your facility in the directory to be compiled by the American Heart Association?

93% Yes      7% No      (N=517)

RECOMMENDATIONS

Robert M. Levenson, M.D.

Gerald F. Fletcher, M.D.

Henry S. Miller, M.D.

L. Loring Brock, M.D.

Samuel M. Fox, III, M.D.

Blair D. Erb, M.D.

Sterling B. Brinkley, M.D.

Thomas P. Hackett, M.D.

Kathy Berra, B.S.N.

Eugene Spiotta, M.D.

Patrick A. Gorman, M.D.

James S. Skinner, Ph.D.

DR. LEVENSON:

We should develop a summary of recommendations that can be used for the Rehabilitation Subcommittee, that could be sent on to the College of Cardiology, College of Physicians, College of Sports Medicine, all of whom should respond to this kind of meeting. I hope those of you who are members of these organizations will take this to them so reactions can be obtained and returned to Mr. Maxon.

We have managed to accomplish one of the charges of the Rehabilitation Subcommittee which is to meet with other interested organizations. The fact that these organizations are represented, is good evidence there is wide interest and room for a cooperative effort. Secondly, something that wasn't stated deserves mentioning - there has been no comment about the AHA exercise guidelines published in CIRCULATION. Nothing adverse, nothing to suspect they ought to be changed. This suggests they serve as the law of the land in terms of what is to be done in the area of exercise testing laboratories, exercise training, and exercise equipment. When Dr. Erb and his Target Activity Group complete their material on the training maintenance programs, the exercise area will be completely covered.

Dr. Skinner indicates that the next meeting could be held with the College of Sports Medicine in May in Las Vegas where those of us who are interested can participate. I hope the same kind of format can be used and, as Dr. Brock said, that perhaps another meeting might get down to a little more of the nitty gritty concerns. This has been a pilot meeting, it served as a good beginning. Now I would like to open this to all of you for recommendations or comments that should be recorded and used as part of the proceedings.

One brief comment: A definition of exercise will probably be coming out in the new exercise booklet and that would be an opportune time to raise that as another question. Also, I forgot to mention the position of the College of Sports Medicine regarding certification. Most of us feel that it is an important thing to do and, if they are willing to do it, we should encourage them to do it; support them; endorse their activities. We should not take it on as a Heart Association effort.

DR. FLETCHER:

- (1) Because of some of the statements made here and some recently published literature on exercise testing, perhaps a statement might be directed through the Exercise Committee or Rehabilitation Subcommittee on what is meant with regard to proper utilization of exercise testing.
- (2) In addition, we are seeing more intriguing data on exercise and hematology - specifically the effects of training on platelets and fibrinolysis.\* Curtis Hames reported early findings in Evans County, Georgia, with regard to platelet effects in people studied on treadmills (trained and untrained). This is an area for future investigation in both exercise testing and training.
- (3) Also (very appropriate for today), some comment should be recorded on the dangers, misuses, and abuses of exercise.
- (4) Lastly, we should define exercise more explicitly and address the topics of exercise equivalents and daily physical energy expenditure.

\*References available on request.

DR. MILLER:

We need to stop comparing the graded exercise test, which is a physiologic (functional) test, with the anatomy of the coronary circulation determined by arteriography. It is being done using groups that have a predominance of disease or those on the other hand with almost no disease as populations to test. We are using the exercise test primarily as a functional test in our setting as the diagnosis is already confirmed. For the most part, the articles are not documenting the level of exercise that produces the changes called positive or negative. There is rarely any comment concerning the exercise protocols used or the total amount of work or work/pleasure product to produce positive changes or the level at which no changes are noted in these various articles.

In reference to preparing a statement concerning Graded Exercise Testing (GXT), the Graded Exercise Test properly performed is still one of the best mechanisms of evaluating therapy that we have - probably better and much less expensive than doing repeated coronary arteriograms and many other studies. Some statement concerning the use of exercise and radio-isotope techniques together in order to see what dynamic changes do to the heart muscle wall should be made.

Many of the more stable members of our profession have developed a very negative attitude concerning GXT. As you know, the negativism has been propagated in all of the

business literature where there are many, many questions now being asked about there being any validity in the GXT as a diagnostic tool.

Probably the single most important point in our statement should be that this test is a good predictive test to determine what is going to happen to a person over the years, whether it correlates with the coronary anatomy or not, as many of our colleagues have shown us, from Dr. Masters many years ago right on up to more recent articles and studies.

Dr. Fletcher's comments about a definition of exercise and the types that should be prescribed is good. Maybe just a simple discussion of all the aerobic types of exercise that are available to everybody, would be good to get away from the absolute drudgery of jogging, that many people describe. Make exercise more fun by developing many alternatives to jogging, one of which should be attractive to everyone.

DR. BROCK:

It is time to take a look at the image of the physician and his position in this kind of activity. I don't know of anything more dearly held than the concept that the physician is too busy to get into this kind of an activity and so by default, he is eliminated. That image is perpetuated in many quarters and the question is, is it a valid issue, is it a scientifically valid process: rehabilitation, exercise, or prevention, or what have you. If it is something he feels is important, then he should be included in these kinds of programs in the community. It may have some value system considerations, as we mentioned the economics are certainly, at this time anyway, far below what a physician can do just practicing medicine in the office or running a cath lab, or being a hand-maiden to surgeons. We do have much to say and much to do in this and the physician should not automatically be eliminated from this process because he is too busy. There may be some who have values that are not strictly economic and who would get involved in it if the opportunity was provided. The opportunity can be provided without painful economic compromises.

The "Busy Physician" business is something we did ourselves. It is a great protective mechanism. We use it as an excuse when we don't do something or we don't want to do something; it's an a pretty easy out.

DR. FOX:

I'm impressed with the competition that exists in trying to get time in medical school curriculum in so many different areas. Certainly cardiology as a subject is becoming a great deal more interesting and exciting to those of us who know it. The same is true with the new data on pulmonary disease and functional capacity changes that can be realized. Medical schools throughout the country, do not have near the necessary amount of time and emphasis, most of us in this room feel, is appropriate for dynamic health in cardiovascular pulmonary and related areas. A group with the constituency we have here might address the question as to whether there could be appropriate input to the AAMC or other group or just a position paper to our individual deans. This would indicate the persuasion we all have that this should be part of the curriculum within the schools. It should be included even if a person becomes an ophthalmologist or a dermatologist and particularly if they become a psychiatrist.

In the past this has been looked on as strictly a corner of cardiology that is not palpable to family practice and some other elements and this should be changed. We should address this at some time. Also, we should get in touch with the NIH group that addressed the feasibility of undertaking more definitive research on the place of physical activity in both prevention and rehabilitation. They were to have had the report of that spring meeting out sometime this month. Next time around, perhaps we should touch base with them and try to get input to their decision, if they did decide on where the National Heart, Lung, Blood Institute's program should be advised to go. Even if they came up with a relative negative, we should try to address the problems that concern getting support for patient services, particularly of getting third party justification.

DR. ERB:

I am in complete agreement with Dr. Brocks' comments on the responsibilities and the authority of the physician in the fields of rehabilitation and prevention. Some of the work in this field depends on value judgments. Some is dependent on the interests and goals of the individual. Yet recognizing indications and interpretations of some of the highly technical procedures such as treadmill testing is dependent on the artful application of a hard science. The hard science has been defined as Work Physiology.

When these procedures are available at sites where quality controls are lacking, the profession, the hospitals, the public, and the insurance have more concern-and more problems-with quality assurance. Please notice some of the underlined statements in your handout where the illness-wellness systems are defined. Notice the statement: "written in this definition, however, is the absolute need for the medical profession, because of its training in disease and authority to interpose therapeutics, to provide an authoritative basis for program development especially in matters related to disease". There is another underlined item: "it remains, therefore, imperative that the system responsible for treatment of the ill provide basic principles of concern for all health professionals in matters of prevention and rehabilitation". And, finally: "when applied to clinical medicine, this physiological function must be tempered by the art of medicine calling into play those features of personal need which make up the complex constellation of features called state of health".

Essentially what was said here is that the interface between illness and wellness where we define the functional status of the individual must still be the responsibility of the medical community, and the medical profession must accept the authority in that area. In the Work Physiology cube where workload is the X axis, physiologic response is the Y axis, and disease is the Z axis, the entire cube (except the frontal plane) is modified by disease.

Because of the seriousness of dealing with subjects with cardiovascular disease and the basic trust the public must hold for the health system, we face here a major issue of quality assurance. This brings us to two important points.

- I. We must define that area which is the common denominator to each of the clinical disciplines-cardiology, internal medicine, pulmonology, rheumatology, or Sports medicine. Work Physiology is accepted as that discipline. Each clinical service may deliver it in a different manner consistent with its needs and mission. This identifies an academic area in which there is commonality of interests.

2. The second area, economics, is more pragmatic. A discussion of economics carries with it the need to debate the issue of quality control and quality assurance. Our programs are complicated by our economic structure, especially as it relates to the third party carriers in the insurance industry. An artifact of the insurance industry is the division of the industry (as it relates to individual health) into health insurance, disability insurance, and life insurance.

These three interested components project dissimilar endpoints which are at times conflicting with other components. For example, it is to the economic advantage of the health insurer to encourage early hospital discharge. This may be at the expense, however, of the disability insurer, or even the life insurer. Similarly, death ends the economic liability of the health insurer and the disability insurer, but this is at the expense of the life insurer.

Of economic interest to each segment of the insurance industry, individually and collectively, is the need to encourage prevention and rehabilitation.

In the interest of making the prevention and rehabilitation efforts operational, perhaps the American Heart Association could serve as a responsible body pulling together these components (health, disability, and life) of the insurance industry to develop a resolution of this artifact.

DR. BRINKLEY:

Referring back to yesterday morning I'll just indicate our interest in keeping up to date with the certification process, particularly with the National Commission on Health Certifying Agencies so that our interest in maintaining quality without excluding any qualifying group can be carried out. On the subject of the leadership role of physicians in encouraging suitable fitness or wellness programs for adult Americans, I wonder whether or not physicians in general are sufficiently interested or able to provide effective leadership.

Leadership is being provided by other professional persons, particularly physical educators with an understanding of the implications for health. Today there is a tremendous interest in fitness, and people are establishing their own programs and will continue to do so with or without the guidance of the medical profession or any akin profession. I'm not sure we can stop them, and I'm not sure we want to.

DR. HACKETT:

I'd like to second the motion that we define what exercise is. A definition is timely now because we are in the midst of a cult of fitness. Most of the focus has been on running, but running isn't the only exercise. We need to define what we mean by exercise, or people will consider it synonymous with running. I want to thank you for including a psychiatrist in your deliberations. It is right that a psychiatrist should be included; it was foresighted of you to have me here. The emotional side of heart disease is so intermingled with the disease process itself that I am not at all sure one ought to compartmentalize the two--the psychs and the soma. I am sure that one day when any illness is mentioned, the concept will include both the psychological and the physiological. I like to think the fact that I am here represents a start to that kind of thinking.

At lunch time today we were talking about treadmilling, and I described my own experience with the treadmill test. There is a psychological component that ought to be taken into account, especially when a jogger is exposed to treadmilling. For someone who runs or jogs regularly, there is an artificiality to treadmilling; the environment--the surround--is so different from what one is conditioned to associate with running. For example, I always run on a golf course and am used to seeing trees, sky, and lawn. In the treadmill room I saw a time lapse clock, a defibrillator, a cardiologist, and two cardiac nurses. Furthermore, as a jogger, I was used to controlling my sense of fatigue by adjusting my pace. Once or twice I tried to relax by this means and was nearly tossed off the treadmill. The whole experience was of a very different sort from the jogging I was accustomed to. It made me nervous, which in turn undercut my physical stamina, which, in a vicious circle, added to my nervousness. The end result, I think, reflected not only primary physiological changes but psychological ones as well because I was operating under a quite stressed nervous system. That particular treadmill run was a good deal more stressful than a comparable jog or run would have been off the treadmill. I haven't heard the mental stress of treadmilling discussed before by any of the individuals who have operated treadmills. I have, however, heard other runners and joggers speak of similar difficulties they experienced while treadmilling.

MS. BERRA:

I would like to stress my support and encourage the AHA to also strongly support the standarization and credentialization being offered by the American College of Sports Medicine in the fields of Exercise Testing and Cardiac Rehabilitation. One of the major problems we face in rehabilitation is one of the problems about which the insurance industry is most concerned. That is, who do we pay for and who is doing a job which is reimbursable and how do we know if it is worth ten dollars a session, or \$40 a session, and is their treadmill test worth \$150. We'll pay for it if it can be shown to be valuable and therapeutic, but, you know, there's no other way to tell.

One of the things the National Y has attempted to do in putting our protocol together is to standardize rehabilitation within the setting of the YMCA in the community so that you, as physicians in your capacity as leaders in rehabilitation, can feel secure that YMCA's are not offering unsafe, ill-defined programs. And that, indeed, your patients are safe there, and they will be getting a standard therapeutic approach which meets all the continuing changes and needs of the cardiac patient relative to rehabilitation. So, I heartily endorse the certification process. The second thing I would like to say is that I really do appreciate, as a nurse, being involved in a group like this because I know all of you have worked very closely with nursing and know we are interested, concerned, and have valuable input. Nursing should be involved in all levels of management - both administrative and clinical - in Cardiac Rehabilitation Programs. Thank you for two very informative, challenging days.

DR. SPIOTTA:

It's seldom I have little to say. Dr. Erb will tell you that; but I want to thank you for inviting me here as representative of the American College of Chest Physicians.

We have no section, forum, or committee regarding cardiac rehabilitation. The only thing I can say is that I will carry with me to our next meeting a recommendation that we, at the American College of Chest Physicians, establish such a committee and/or forum and to have it included as a necessary component of heart treatments.

DR. GORMAN:

I have comments in a couple of areas. First, in response to Dr. Hackett's impressions of the treadmill as a cause of excessive anxiety in patients undergoing exercise testing, there are couple of simple and perhaps prosaic type things that can be done to reduce that type of experience. One is to place a suitable poster such as a beautiful landscape in front of the treadmill. Posters are inexpensive and maybe can be obtained free from travel agencies or airlines. Or else, of course, you can place the treadmill so that the person being tested is looking out of a window. We have not experienced such difficulties with our treadmill candidates, and I was a little surprised that you have found it to be such a traumatic experience. I have often noted an inverse relationship between the person's intelligence and the difficulty with which they perform such tests. It is important that we communicate.

In order to keep these remarks brief, I would like to make them in outline form. First, the area of health care delivery: we as rehabilitationists in our own geographic areas need to think in terms of how to plan regional cardiac rehabilitation needs and, of course, require collaboration with the local Heart Association affiliates. What is the optimal catchment area? What is the optimal size of cardio-rehabilitation program. You obviously must have an optimal range; there must be a number that are too small in terms of patients and a number that are too large. That type of information should be taken into account in planning. Directory Information: our own affiliate is working in that area, and we would like anyone who calls the Heart Association to be able to get concise information as to what programs are available and their operational status, capability, and so forth.

In the area of disciplines of participating staff, the last five years have seen significant advances in the technology of exercise testing and exercise training. Computer assisted systems for exercise are now almost the rule rather than the exception. Five years ago they were in the development phase; now they are available off the shelf. Obviously, technology has further to go. Digital displays of heart rates are commonplace. In our own group we've just developed a computer program which allows us to have displays of the monthly attendance, activities, and adverse reactions, if any. I'm sure computer assistance in this area has a long way to go. It would have been helpful, and perhaps in future meetings of this sort we might plan to include either computer specialists or engineers as participants. Another group of people that deserves to be represented is the orthopedist. Locally, we are fortunate to have a very enthusiastic orthopedic surgeon and runner who started up a running clinic which has become extremely popular and serves an important function. I'm not just limiting the application of this to the healthy jocks but to people who have definite osteoarthritic and similar problems who could use the help of an orthopedist or a rheumatologist.

In the areas of communications, we do need to get some uniformity in the terms of the language we use, such things as defining dropouts and defining the adverse reactions, benefits, and so on. If we were to do that, we would simplify documentation of our activities and the assessment of the effectiveness of these activities. A further thing I would personally see as a need is improvement in psychological rating tools. Many of these have been developed by psychiatrists and psychologists who have interests other than cardiac rehabilitation, and it's certainly good to have people like Dr. Hackett interested in this area. I hope this important area will continue to be developed.

DR. SKINNER:

On behalf of the American College of Sports Medicine, I would like to thank all of you for inviting us here. When Dr. Levenson introduced the meeting yesterday, he said that we wanted to have a continued dialogue and to think about another possible meeting with people from this group as well as from other organizations. One of the priorities that I had coming in as the President of the American College of Sports Medicine was to increase liaison between our organization and others with similar interests; this meeting has helped that goal. As a result of this meeting, I plan to go back to our Preventive Rehabilitation Exercise Committee to discuss the possibility of having another meeting in conjunction with, or the same time as, our national meeting in Las Vegas next May.

Sometime next month I will write to the presidents of the various organizations represented here for ideas and suggestions and for ways that we can continue the dialogue. If any of you have suggestions, I would appreciate it if you would write to me. Answers are needed to the kinds of questions we have been discussing here (e.g. who should get this kind of information together, how can we do it, etc.). We will be glad to work with any of you in this regard and to try to find some method for continuing the dialogue. Thank you.

AMERICAN HEART ASSOCIATION

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CONFERENCE - ALTERNATIVES IN CARDIAC CARE:

PREVENTION AND REHABILITATION

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